John Cranford,
M. D.

THE

MEDICAL REPOSITORY.

CONDUCTED BY

SAMUEL L. MITCHILL, M. D.

Professor of Chemistry in Columbia College, &c.

AND

EDWARD MILLER, M. D.

Molli paullatim flavescet campus arista,
Incultisque rubens pendebit sentibus uvâ,
Et duræ quercus sudabunt roscida mella.

VIRGIL.

LIBRARY OF THE
FOUNDED 1313
CITY OF

VOL. III.

NEW-YORK:

Printed by T. & J. SWORDS, Printers to the Faculty of Physic of Columbia College, No. 99 Pearl-street.

1800.

5970

Crawford

INDEX

TO

VOL. III.

Page.

ACID, of the baſe of the muriatic 214
Acid, ſeptic, wherein it differs from nitrous and nitric 415
Air produced from water by freezing 422
Adamantine ſpar and baſaltes 202
Adams on the principle of Animation 297
Aeroſtatic inſtitute, account of the French 97
Agriculture, obſervations on 71
Alkaline ſalts and earths, their anti-peſtilential effects 1, 14, 156, 161, 202, 261, 302, 404
Animation, on the principle of 297
Archer on the uſe of ſaccharum ſaturni in diarrhœa 237
Barker on febrile diſeaſes in the Diſtrict of Maine 364
Barker's account of a cure of obſtinate eruptions by chalk 412
Barton's Fragments of the Natural Hiſtory of Pennſylvania 69, 177, 215
Baynton on ulcers of the legs 93
Beddoes on pulmonary conſumption 75, 216
Beddoes's medical pneumatic inſtitution 423
Beef, ſeptic acid vapours extricated from while corrupting 309
Bellinger, John S. admitted to the degree of M. D. 215
Blanchet on the vapour of the River St. Lawrence 154
Blanchet on the antiſeptic powers of lixivial and oleaginous ſubſtances 156
Blanchet on the diſeaſes of cattle in Canada 257
Blanchet's theory of exploſions 262

Page.

Blanchet's diſquiſitions on medicine 413
Bones, of the difference in the quantity of ammoniac obtained from 210
Bordley's Notes on Huſbandry 274
Boſton prize-medal 413
Bread fruit-tree 205
Brown on the yellow fever of Rhode-Iſland 267
Brown's, Dr. John, maſonic relics 340
Brown, Dr. Samuel, prize adjudged to 413
Cairo, French national inſtitute at 73
Caldwell's oration on Peſtilential Diſeaſes 58
Canada, chart of Lower 203
Canada, on the diſeaſes of cattle in 257
Carendeffez's experiments on nitrous and nitric acids 415
Carendeffez's manufacture of neutral ſalts 418
Caſſowary, account of 67
Cement for preſerving wood and brick from decay 306
Chalk, eruptions cured by 412
Chancres, venereal, cured by deliquiated carbonate of pot-aſh 303
Chemiſtry, new nomenclature of 271
Cold, artificial 428
Columbia College, botanical donations to 68
Columbia College, decree of the truſtees reſpecting the ſtudy of chemiſtry 205
Commencement in the univerſity of Pennſylvania 66
Condie and Folwell's Hiſtory of the Yellow Fever in Philadelphia 288

Page.

Connecticut Academy of Arts and Sciences 214
Conſumption, on pulmonary 75, 216
Coſta's (Da) account of the materials of which Liſbon is built 1
Cow-pox 70
Cryſtallization, on 253
Cumberland, on febrile diſeaſes of 364
Currie and Hoſack on the Yellow Fever 399
Dartmouth College, diſtempers in the neighbourhood of 5
Dartmouth College, medical graduation in 419
Dearborn's new invented vibrating ſteelyard 300
Delaware, diſeaſes of the State of 221, 236, 268
Delaware, Philoſophical Society of the State of 306
De Witt on the œconomy of fuel 229
Diamond, combuſtion of 313
Dickſon on the expanſion of water 34
Digitalis uſed as a lotion for anaſarcous inflammation 428
Diſeaſes and weather, ſtate of 63
Diſeaſes, hiſtory of epidemic and peſtilential 215, 278, 390
Doctor of Medicine, degree of conferred 66
Dropſy, a ſingular caſe of 361
Epilepſy, cure for 423
Eruption, report on the volcanic at Guadaloupe 51
Eudiometer 212
Eudiometer, Gren's 220
Exploſion, on the theory of 262
Fæces, diſcovery of ſeptic acid in the alimentary, in a perſon deſperately ſick of yellow fever 307
Ferriar's remedy for anaſarcous inflammation 428
Fever, obſervations on the yellow 344
Fiſhes, on the multiplicative power of 422
Flies, of the American bliſtering 213
Flores martiales and ens veneris, of the compoſition of 211

Page.

Fluids of human bodies 161
France, medical intelligence from 311
French national inſtitute at Cairo 73
French aeroſtatic inſtitute, account of 97
Fuel, probable ſcarcity of 72
Fuel, on the œconomy of 229
Galvaniſm, report on 75
Geological remarks 151
Gonorrhœa virulenta, cure of by ſoap-injection 302
Gould's perpetual ſea-log for determining the longitude 413
Gren's eudiometer 220
Guadaloupe, report of the volcanic eruption at, in 1797 51
Guanchios, account of 156
Hail and hail ſtorms 81
Hamilton on the ſmall-pox 194
Hardie's account of the malignant fever in New-York 291
Harneſs on the cure of ulcers 102
Henry on digitalis and opiate friction 316
Higgins' improvement in bleaching 320
Hildebrandt on the ſolution of mercury in the nitric acid 323
Hiſtory, fragments of natural 177
Holt's account of the yellow fever at New-London 292
Hoſack on tetanus 21
Hoſpital, the lying-in 64
Inoculation, matter of the vaccine diſeaſe for 310
Inſtruments, obſervations on meteorological 36
Kunze's cabinet of coins and medals 351
La Vera Cruz, account of 46
Lee on the yellow fever of Port-Elizabeth 246
Liancourt's Travels in North-America 71
Lime-ſtone and marble, beſt materials for paving ſtreets and building houſes, becauſe they abſorb ſeptic acid 1
Liquids, apparatus for impregnating with carbonic acid 320
Liſbon, materials of which it is built 1

Page.

Literature, feats of German 74
London, Royal Society of 77
Londonderry, on the diſeaſes of 108
Machine for expelling foul air from veſſels 89
Maclean's reply to Woodhouſe 138
Magazine, New-York Monthly 66
Manhattan Company, incorporation of 65
Mansfield's eſſays on mathematics and phyſics 301
Marſeilles, medical advice from 203
Maryland ſociety for promoting uſeful knowledge 416
Maize or Indian corn, produce of 301
Mechanical improvements and inventions, inſtitution for diffuſing the knowledge of 78
Medical caſe, a ſingular one 32
Medical and Phyſical Journal 215
Medical pneumatic inſtitution 423
Medicina nautica 74
Midwifery 219, 302
Miller's hiſtory of New-York 66
Mitchill's obſervations on potaſh 14
———'s theory of hail 81
——— on the fluids of human bodies 161
——— on the mineralogical hiſtory of the State of New-York 325
———'s facts in natural hiſtory 420
Monro on the epidemic at Wilmington 136
Mons, Van, on the preparation of æthiops antimonialis 321
——— on the non-oxygenability of the ſulphuric acid 322
——— on the formation of the white oxyd of mercury 324
Natron (native alkali) diſcovery of 74
New-London, yellow fever at 292
New-York lying-in hoſpital 64
——— Monthly Magazine 66
———, Miller's Hiſtory of 66
———, medical ſchool of 67
———, malignant fever in 291
——— medical ſociety, report of their committee 292

Page.

New-York agricultural ſociety 301
———, decompoſition of ſoap-ſuds by the ſeptic or peſtilential air of 308
———, mineralogical hiſtory of the State of 325
———, on the lake fever in the State of 359
——— Tranſactions of the agricultural ſociety of 386
——— agricultural ſociety, donation of Sicilian wheat to it 420
Nitric acid, of the non-action of it on ſilver, copper, and tin 207
Nitrous air, remarks on the conſtitution of 27
——— fumigation, 200
North-Carolina, hiſtory of 66
Oils, of aromatic 212
Opium, deleterious effects of 150
Papon on the plague 314
Paper, new material for the manufacture of 203, 314
Paralyſis cured by vital air 319
Parent, peculiarity of the male manifeſting itſelf in his offſpring 419
Paſcalis on the yellow fever 344
Patentees, requeſt to 418
Patterſon's meteorological obſervations 36
——— on the diſeaſes of Londonderry 108
Pearſon on the vaccine diſeaſe 315
Perſpired fluids, how they turn to peſtilential fluids 161
Peſtilence 197
Philadelphia, chemical ſociety of 68
———, academy of medicine in 69
———, yellow fever in 288
———, obſervations on the yellow fever in 294, 296
———, officers of the academy of medicine in 305
———, a ſketch of the riſe and progreſs of the yellow fever, and of the proceedings of the board of health, in the year 1799 399
——— medical ſociety, prize-queſtion of 417

Page.

Philadelphia, academy of medicine 423
Phyſic, advantages of its ſtudy in America 414
Poemata Georgica, de cultura Radicis Braziliceæ, &c. 173
Poppy-plant, on its cultivation 206
Port-Elizabeth, on the yellow fever at 246
Pot-aſh, obſervations on 14
Pox, on the cow 70
——, on the ſmall 194
Prieſtley's replies to his anti-phlogiſtian opponents 116, 121, 124
——'s opinion on the doctrine of ſepton . 307
——'s doctrine of phlogiſton 379
Privies, fever and dyſentery produced by the ſeptic vapours of 409
Pygarg 67
Rhode-Iſland, on the yellow fever in 267
Ricketſon's experiments on the cultivation of the poppy-plant 206
Ruſh's lectures on animal life 69, 189
—— on the yellow fever in Philadelphia 294, 296
Saccharum ſaturni in diarrhœa, on the uſe of 237
Saccharum ſaturni in epilepſy, on the uſe of 423
Schirrhus and cancer, remedy for 302
Sayre on the diſeaſe commonly called yellow water in horſes 342
Seaman on the deleterious effects of opium 150
Seaman's ſyllabus of lectures on midwifery 302
Seaman's Midwifes' Monitor & Mothers' Mirror 407
Septon, ſingular effects of the gaſeous oxyd of 305
Sharpleſs' collection of portraits 67
Shotwell's diſcovery of a repulſive power in lead 417
Silver, oxydation of, by ſeptic acid 410
Small-pox 105, 194
Smith's geological remarks 151
—— on cryſtallization 253
—— on the dropſy . 361
Solfatarra, ſulphureous minerals from 419

Page.

Spalding on the malignant diſtempers around Dartmouth College 5
Spalding's new nomenclature of chemiſtry 271
Starch prepared from the fruit of the æſculus pavia 211
Steelyard, new invented vibrating 300
Swallows, on the ſubmerſion of 241
Sulphur, the earth beſprinkled with a yellow powder miſtaken for 414
Tazewell's Vade-mecum Medicum 54
Tetanus cured by wine 21
Thorne's account of La Vera Cruz 46
Tilton on the yellow fever of Wilmington 128
Tracy on the union of ſmall-pox and meaſles 105
Trotter's Medicina Nautica 74
Trees, locuſt, putting forth bloſſoms a ſecond time 420
Trees, apple, regeneration of the bark of ibid
Trees, wild-cherry, retrograde motion of ſap in 421
Tytler on the plague and yellow fever 373
Vaccine diſeaſe, matter of received from London 310
Vapour which ariſes from the ſurface of the river St. Lawrence during the cold of winter 154
Vaughan on the diſeaſes of the State of Delaware 221, 336, 368
Vaughan's Chemical Syllabus 406
Vine, on the culture of the, in the United States 411
Ulcers of the legs, method of treating them 93
Ulcers, uſe of the gaſtric juice of graminivorous animals in the cure of 102
Unguentum hydrargyri, proceſs for preparing 77
Urine, putrid, expoſed to the froſt 210
Waſhington, diſeaſe and death of General 311

Page.
Water, expanſion of, during congelation 34
Water-works in New-York 65
——— in Philadelphia ibid
Watkins on the lake fever 359
Weather and diſeaſes, ſtate of 63
Weather, ſeaſons, and phyſical phenomena, plan for obſervations of 299
Webſter's Hiſtory of Epidemic & Peſtilential Diſeaſes 215, 278, 390
Wheat, donation of Sicilian, to the agricultural ſociety of the State of New-York 420
Williamſon's hiſtory of North-Carolina 66
Wilmington, yellow fever at 128, 136
———, origin and cauſe of the yellow fever at 221, 336, 368
Woodhouſe on phlogiſton 69
——— on the non-action of nitric acid, &c. 207
Wynkoop's ventilators for ſhips 89
Zoology 67

LIBRARY OF THE
UNIVERSITY OF ILLINOIS

MEDICAL REPOSITORY.

VOL. III.—No. I.

ARTICLE I.

DESCRIPTION *of the* CITY *of* LISBON; *ſhewing the Utility of conſtructing the Houſes, and paving the Streets of Cities, with Marble, Limeſtone, or other Calcareous Materials, in Preference to Silicious Materials, or Bricks of Clay. In a Letter from* HIPPOLYTO I. DA COSTA, *Eſq. of Liſbon, to Dr.* MITCHILL, *and recommended to every Philoſopher and Police-Officer in the United States.* (See Med. Repoſ. vol. ii. p. 39 & ſeq.)

DEAR SIR, *New-York, May* 21, 1799.

YOUR theory, in regard to the action of *alkalis* and *calcareous earth* upon ſepton, or the principle of corruption, is ſo well proved in the ſeveral papers you have publiſhed, that it is needleſs to adduce further proofs to perſons of knowledge: but as additional facts may be uſeful to perſuade people of leſs information or more prejudices, I believe I agree with your wiſhes in preſenting to you an account of the influence of calcareous earth upon the putrid effluvia in the city of Liſbon, which is, I think, a proof of the moſt intereſting nature.

The city of Liſbon (Liſboa) is ſituated on the northern bank of the river Tagus (Tejo), about eighteen miles from its mouth, in nearly lat. 38 degrees north, long. 65 degrees eaſt, from the meridian of Philadelphia: it is about ſix miles in length, and its breadth is, in ſome parts, two, in ſome three miles, although in ſome parts very narrow. In the moſt inhabited part of the city there are ſeven hills or mountains, which, of courſe, occaſion declivities and lower ſituations. This city may be divided into the *new* and *old* city; becauſe there is a ſpot which was overthrown by the horrible earth-

quake of the year 1755, and was rebuilt: I call, therefore, this part the new city. The ſtreets, in this quarter, are very regular, the buildings neat, and the pavements for foot paſſengers very commodious; but the ſituation is almoſt all very low.

The old city, or the part which did not ſuffer ſo much in the earthquake, and preſerves its ancient buildings, is in the Gothic taſte, with narrow and crooked ſtreets, in the moſt of which there are no pavements for foot paſſengers: the houſes are ſo high, that, in ſome of the narroweſt ſtreets, the ſun cannot be ſeen but two or three hours every day, viz. from eleven before noon, to one after noon. In the new city there are gutters or ſewers below the earth, to conduct the water and impurities from the houſes and ſtreets to the river; but in the old city there are none of theſe.

As the houſes are, in general, five or more ſtories high, and the ſtreets narrow, it is eaſy to conceive the thickneſs of population, and, of courſe, the vaſt quantity of impurity that comes into the ſtreets every day, which, with the water and other liquids poured in likewiſe, keep always there a vaſt quantity of dirt. A great ſum of money is appropriated, I know, and ſome pains taken, to preſerve the cleanlineſs of the city: but without entering into the diſcuſſion how this money is employed or diſpoſed of, which is but very little intereſting to our preſent inquiry, it is true that, very often, I have been obliged to make a great turn to go a ſhort diſtance, becauſe it was impoſſible to croſs the ſtreet through the dirt; and very often I have ſeen dogs, cats, and other dead animals, lie in the ſtreets.

There is, in every houſe (chiefly in the new city), a privy, with a canal, which goes up to the higheſt ſtory; becauſe, as the ſeveral ſtories are inhabited by different families, they want ſuch a convenience in every one: but this canal emits always a very bad ſmell, by the accumulation of impurities within its walls, which, from the form of its conſtruction, cannot be waſhed but with water, let in by a ſmall orifice or hole. There is alſo, in many houſes, a place in the inſide of the ſtreet door for making water, which contributes its portion of bad ſmell; and the houſes are, in general, not very clean.

Beſides all theſe ſources of putrid exhalations, there are a great many wharves, and much naked ſhore, which being uncovered by the ebb-tide, preſent to the ſun a ſurface covered with dirt and ſea-weeds, undergoing putrid fermentation. The mouths of the ſewers I have mentioned above go to the wharves,

and are likewiſe bare at low water. The fluid which comes from theſe ſewers contains ſo many infecting matters, that its ſtrong putrid ſmell can ſcarcely be endured.

After this ſhort deſcription of the police of Liſbon, in regard to its cleanlineſs, every body would draw the inference, that endemical diſeaſes muſt reign, not only in the ſummer, but in the winter time, ſeeing that the accumulation of the dirt in the ſtreets is incomparably greater in the winter than in ſummer. The connection there is between malignant diſtempers and dirtineſs, is very well known, and expreſſly marked by Tiſſot. (*Avis au Peuple ſur la Santè*, chap. ii. § 7.) Happily, Sir, the contrary is the fact: Liſbon is one of the moſt healthy ſituations I know, and its inhabitants do not ſuffer but the *common* diſeaſes to which the human body is ſubjected. Many people go from England and other countries to Liſbon, in certain diſeaſes, to enjoy the benefit of a ſalubrious place, and very often to ſpend the ſummer agreeably in a good and wholeſome climate.

What then can be the cauſe of this apparently phyſical contradiction between the impurity and corruption in the ſtreets, and the ſalubrity of the air? I confeſs, Sir, I cannot find any explanation of this phenomenon, if I reject the theory of the influence of calcareous earth upon ſeptic fluids, and I can well comprehend the reaſon if I admit it.

The buildings in Liſbon are all of *ſtone*, and, in general, of *marble of ſeveral qualities*, and chiefly the *marmor raſilis* of Linnæus; and this ſtone is procured in the neighbourhood of the city. All the houſes are *white-waſhed inſide* and *outſide*, and the handſomeſt new-faſhioned houſes are plaſtered with a plaſter they call *eſcariola*, a compound of gypſum and other matters, and painted over that compoſition in water-colours. As a number of new buildings are continually erecting, there are, in all the ſtreets, a great many ſtone-cutters, hewing the ſtones, and their fragments are ſcattered through the ſtreets. In the time of the earthquakes, as the houſes fall down, the attrition of the ſtones, one againſt the other, breaks them in pieces, reducing many to a powder. The pavements for the foot paſſengers are of *large marbles*; and, in many parts, the ſoil is *calcareous* too: and, in other parts, as the ſtreets are paved with ſmall round ſtones or pebbles, the accumulation of the *calcareous powder* makes a ſtratum above the ſurface of the ſtreets and public places. When the wind blows hard there is ſo great a quantity of *calcareous powder* flying about,

that it is incommodious to the eyes, and sometimes is so fine, that it comes into the houses even when the windows and sashes are shut up.

Now, to what can I impute the healthiness of that city but the quality of its *calcareous earth?* which neutralizes the *putrid exhalations*, or *septic acid*, which impregnates the atmosphere, and thus prevents its bad and fatal effects, preserving that city, which otherwise would be the fountain of pestilence, and the anti-chamber of death.

As no other cause can be discovered of the healthiness of Lisbon, amongst its continual putrid infection, recourse may be had to the climate, and to the temperature of the atmosphere; but I believe it can be sufficiently proved, that the cause is the influence of the *calcareous earth*, and not of the climate; because, if this salubrity was owing to the climate, all the neighbourhood of Lisbon, which enjoys the same climate, would enjoy the same healthiness; but this is not the case. On the opposite bank of the Tagus, over against Lisbon, there are three or four villages, called Almada, Caparica, and Cassilhas, situated on small hills, and surrounded by beautiful farms: the buildings there are, in general, of *silicious stones*, the soil is sandy, and in some parts clayey, and the streets, in these villages, infinitely cleaner than in Lisbon; but intermittent and remittent fevers prevail in these villages and their neighbourhoods almost every summer, while, in the meantime, Lisbon is perfectly free. Near the other part of the river, in the neighbourhood of Lisbon, on the shore of the ocean, there are other small villages, as Cintra and Collares, from whose neighbourhoods the stone of the Lisbon buildings comes, and the soil is, in a great part, calcareous. These places are pointed out as the seat of health, and, indeed, are the most beautiful and pleasant summer retreats you can imagime.

After this statement, can any body attribute the salubrity of Lisbon to its climate merely? Certainly not: because I observe, that where there is *calcareous earth* there is *no infection*, notwithstanding the continual existence of *putrid exhalations*; and where there is not *calcareous earth*, and the soil is sandy, gravelly and clayey, there are *fevers*, although the climate is the same; the distance of these places being only the breadth of the river, about three miles.

To these unanswerable facts I must add, that I have observed, two or three times, in Lisbon, dead animals upon the ruins of houses, and, of course, surrounded with *calcareous*

earth, in a ſtate of deſiccation; and, at the ſame time, two or three fathoms diſtant, another animal dead too, and lying upon another kind of ſoil, in a ſtate of complete putrefaction. The reaſon of their preſervation is obvious: the *ſeptic acid* was abſorbed by the *calcareous earth*, as ſoon as it was formed by the union of ſepton with oxygene; likewiſe, the oil formed by the union of their hydrogene with carbone has been imbibed; the water, formed by the junction with oxygene, evaporated; and the remaining parts of the animal were left in a dry ſtate.

The effects of *calcareous earth* and *alkalis* ſeem to be very well underſtood by the people of Portugal: they put *chalk* and *plaſter* with the bodies they bury in the churches; and they waſh with plaſter the rooms where there has been any ſick of contagious diſorders. This precaution they never omit.—I pray you to accept my beſt wiſhes.

I am, dear Sir,
Yours very ſincerely and affectionately,

HIPPOLYTO I. DA COSTA.

SAMUEL L. MITCHILL, *Eſq.*

ARTICLE II.

A DISSERTATION *on the* BILIOUS MALIGNANT FEVER *which prevailed in the Country adjacent to Dartmouth College, in the Summer of* 1798. *Read before a Private Medical Society, at Dartmouth College, December* 12, 1798. *By* LYMAN SPALDING, *M. B. Lecturer on Chemiſtry and Materia Medica in Dartmouth College.*

IN the ſummer of 1798, many towns, in the country adjacent to Dartmouth College, were viſited by a typhus fever, of a type different from any thing heretofore ſeen in that part of New-Hampſhire and Vermont. It was prevalent in Hanover, Walpole, Unity, Windſor, Bethel, Royalton, Sharon, Barnard, Rockingham, &c. indeed, almoſt every town in the country round about was infeſted.

Hanover, Walpole, and Windſor, are handſome country towns, the compact parts of which contain nearly ſixty houſes, beſides ſhops, out-houſes, &c. The other parts of thoſe towns, and the other towns, are more thinly inhabited.

I ſhall confine my deſcription chiefly to the town of Hanover, where I was myſelf a ſufferer in the diſeaſe, as the fever was identically the ſame in all thoſe places.

Hanover is ſituated in the county of Grafton, on the weſtern border of the State of New-Hampſhire. The town is regularly built, on a ſmall plain, on the eaſtern bank of the Connecticut, half a mile from the channel, and ſeveral hundred feet above low water mark. On the eaſt, the town borders on a low meadow, that is drenched with water in the rainy ſeaſons. The ſoil is clay, mixed with ſand: the former is ſo predominant, that, in the rainy ſeaſons, the ſtreets are almoſt impaſſable. In a dry ſummer they are neat and good. The town is, in a great part, ſupplied with water, brought in barrels from a ſmall ſtream about half a mile ſouth of the college, called Mink-brook. In digging wells, we infallibly meet with a ſtratum of clay at different depth, ſooneſt at the ſouth end of the town. The well-water is neither cool, refreſhing, nor ſweet, but turbid, and, by reſt, depoſits an aluminous ſediment; *it is hard, and does not waſh*, but clots the ſoap. This water has never been chemically analized. There are a variety of ſtones, but the principal one is a compound, with quartz, but no limeſtone. Sulphurous pyrites is found in the neighbourhood. The timber, pine, maple, hemlock, birch, aſh, beech, &c. The ſoil is rich, yielding all kinds of grain and graſſes in perfection; neither is the horticulturiſt diſappointed.

The town is handſomely ſituated on this elevated plain, and conſtantly refreſhed by north, north-eaſt, and north-weſt winds, which are rendered wholeſome and animating by paſſing through extenſive foreſts. South winds are not ſo invigorating, but rather depreſſing to the ſtrength of body, and give a gloomy mind, reſembling exactly, in effect, the eaſt winds of our ſea coaſt. The college and preſident's houſe ſtand on an eminence, on the eaſt, commanding an extenſive variegated proſpect of the adjacent country; and immediately before them is a beautiful ſquare, unadorned by art; but nature has not been wanting on her part: with a ſmall expence it can be made to delight the eye of the man of taſte, and add health to the healthy.

The town has been heretofore exceedingly healthy; never was it viſited with any contagious diſeaſe, till the laſt ſummer, with the dyſentery.

The laſt winter was exceſſively cold and long, the ſpring was rainy: never have I ſeen ſo long and ſevere a rainy ſeaſon at the breaking up of winter. The ſpring ſeeding was much retarded. The ſummer was uſhered in at once, and was as remarkably *hot* and *dry* as the preceding winter and ſpring were cold and rainy. About the middle of June were ſeveral days almoſt inſupportable, and univerſally ſpoken of, by our oldeſt men, as the hotteſt ever known. [We have no thermometer in this place.] Vegetation was rapid, and the harveſt good.

Under theſe circumſtances the fever made its firſt appearance on the 25th of June, in a houſe, No. 1, ſtanding on the eaſt ſide of the main ſtreet, quite at the ſouth end of the town. This patient, Capt. B. had the fever very ſeverely; was a number of days deſpaired of; about this time he diſcharged a large quantity of freſh blood by ſtool, which very much alarmed the attendant phyſician; however, he recovered, though ſlowly.

The ſecond new caſe was Mr. E. preceptor of Moore's Academy. This was not ſevere, but terminated critically and favourably on the eighth day, with a diſcharge of blood from the noſe.

The third new caſe was light; the fourth and fifth ſevere.

July 10. This day four new caſes were reported, in a houſe nearly oppoſite No. 1, which I ſhall call No. 2. About the ſame time another perſon, whoſe buſineſs, in the day time, was at No. 2, was affected. Two of the four belonging to No. 2 died; one on the ſixth, and the other on the fourteenth day of the diſeaſe. In the third the diſeaſe continued thirty days before it came to a criſis, and his life was much deſpaired of.

It was my misfortune to be one of the four attacked on the 10th, the laſt in which a criſis was formed, and the one in which the diſeaſe was moſt favourable, though by no means inconſiderable. The diſeaſe was protracted to the fiftieth day before a criſis, and thirty days was I a convaleſcent.

July 15. Mr. B. in No. 1, was attacked very ſeverely with convulſions.

Aug. 22. Mr. A. of No. 2, while attending commencement exerciſes, was ſo ſeverely attacked as not to be able to walk three rods.

About the ſame time three others, belonging to No. 2, were ſeized. During this time about thirty perſons had had the fever in different parts of the town. When the fever had become almoſt extinct, a perſon who roomed at No. 2 was taken; from him the maid, from her a boy, from the boy a ſecond maid, all of whom had come to reſide at the houſe, No. 2, ſince the commencement of the fever, and two of them when the fever was in no other houſe in town. About the middle of December was the laſt new caſe, and this at No. 2. From this houſe there were probably fourteen perſons affected: I ſay *probably*, becauſe two were not of the family, but apprentices.*

The firſt ſymptoms of the fever were wearineſs, or laſſitude, ſtretching, yawning, languor, pain in the head, nape of the neck, back, loins, with deep ſeated ones in the limbs; watching, ſleep not refreſhing, jactation, nauſea and puking; loſs of appetite, faintneſs, univerſal inertia, pulſe variable, though generally ſmall and weak.

Theſe ſymptoms moſt generally appeared on the morning of the attack, after having gone to bed apparently much fatigued with the exerciſe of the day, with a ſlight cold, and ſome deep ſeated wandering pains like rheumatiſm. In the night, jactation, watching, uneaſineſs, and perplexity.

Puking up a large quantity of yellowiſh-green bitter matter, for ſeveral hours in the morning; by ten o'clock pains in the head, neck, back, loins and limbs, much increaſed, with a ſevere pain at the præcordia: theſe were attended with a cold ſhivering and liſtleſſneſs, and followed by a hot fit and increaſed pains, longing for freſh air, eyes filled with tears, heavy and red, much pain in their motion.

* Since reading the above diſſertation, I have ſeen Dr. Rand's obſervations to the A. A. S. on the ſame ſubject, in which he ſeems to think the fever was not contagious from the diſeaſed. With due deference to the opinion of ſo good a man, I muſt beg leave to add the following caſes in ſupport of my former opinion:

My brother, hearing of my ſickneſs, came twenty miles to my aſſiſtance, remained in my chamber almoſt continually for ſixteen days, taking the ſole care of me. About two weeks after his return he was attacked with the fever; no other perſon within three miles being affected.

In Windſor, a Miſs Bailey was very ſeverely attacked, in the ſickly part of the town, three miles from her father's: an elder ſiſter came to her aſſiſtance, and was immediate nurſe till ſhe recovered: then returning home, ſhe was herſelf attacked, and died. Another ſiſter, who was her immediate nurſe, and had ſeen no other perſon labouring under the diſeaſe, nor been in the infected part of the town, was alſo attacked, and died.

Flushing of the face, redness of the breast and præcordia, with great heat in those parts. Heat in the fauces; the tongue dry, parched, and discoloured, brownish, with thirst. Respiration difficult. Most generally the extremities were cold to the touch, and often the patient complained of their want of heat.

The heat at length subsides, and with it some of the most distressing symptoms, without any appearance of perspiration; though most generally with a dark coloured loose stool, and the evacuation of a small quantity of high coloured urine. The patient is now more comfortable, and can take a small quantity of food; but if the stomach be in the least overloaded, its contents are discharged. However, in the succeeding afternoon or evening the cold fit commences with redoubled violence, nausea, and, in the severe cases, puking a large quantity of dark coloured bilious matter: in one instance this resembled a strong blue dye, giving the bed linen the colour of indigo: the pains in the back of the head and neck are almost insupportable. This was succeeded by an increased hot stage: the face, breast, stomach, and region of the liver, appeared to be penetrated with living fire, while the extremities were cold. This hot fit continued longer than the former, and the succeeding ones were more protracted, till they continued the twenty-four hours almost uninterrupted. The skin was impervious, and communicated to the touch a peculiar biting, burning sensation; neither had the most powerful diaphoretics the desired effect. A total suppression of urine came on, and livid spots appeared on the skin.

The pains of the paroxysms were such as I cannot now call to mind, neither can I find words to convey an idea of them. On a sudden motion of the head, a sensation struck my mind, that only one half of it moved with its accustomed velocity; the other being tardy, in a few seconds came up, giving a sensation of the most violent concussion, leaving an almost insupportable pain for a few minutes. Motion of the eyes was like gouging them out.

Delirium during the paroxysm was a constant symptom in the violent cases: when fierce, it was an infallible sign of approaching dissolution; if with laughter and mirth, on the other hand, not to be dreaded. In watching, or disturbed sleep, there was a constant appearance of *ocular spectra*, passing and repassing, preventing refreshing sleep.

Spasms of the whole body, and of particular parts, with

ſubſultus tendinum, were not unfrequent. The pulſe, during the hot fit, were frequently hard and oppreſſed; but in the cold, and when there was no fit, ſmall, frequent, weak and irregular.

Deafneſs was not an unfrequent ſymptom, which very much alarmed the patient; while, in others, the ſenſe of hearing was ſo increaſed, that the leaſt whiſper gave pain.

Some few laboured under a conſtipation of the bowels, but moſt generally there was a purging, with black, fœtid, watery ſtools: theſe were conſidered dangerous, as they were more or leſs frequent and looſe. Fatality was early in the diſeaſe, with an evident incipient mortification.

The criſis of the fever was very evident: the more violent the attack, the more early the criſis, and the ſooner was health re-eſtabliſhed. In thoſe caſes which I have ſeen, ſcarcely two terminated critically on the ſame day; ſome as early as the fifth, while others were protracted to the fiftieth. One convaleſcent had a contraction of the flexor muſcles of the leg; another was affected with a lameneſs in the hip. Several ſhowed ſigns of hectic.

In the cure of this fever, ſome hurtful and *many* uſeleſs applications were made. It was not in the leaſt effected by thoſe applications which are moſt extolled in the fevers of our climate. Moſt of the practitioners had never ſeen it before, and thoſe who had, from motives of prudence, were unwilling to acknowledge its identity with that of Philadelphia.

On the firſt attack, an emetic, adminiſtered in ſmall doſes, to operate cathartically, relieved the ſymptoms. The effervеſcing mixture given in the hot fit gave univerſal relief. New beer and aceſcent potations were highly grateful.

Calomel, joined with other cathartics, was much uſed. Bliſtering, and mercurial unguent rubbed over the whole body, were uſeful.

Cold air was highly grateful, and eagerly ſought for. To eſtabliſh a current of air through the room was of the firſt conſequence: all the windows and doors were kept open, and the air put in motion by fanning. The rooms were conſtantly moiſtened with vinegar, or vinegar and water. Cleanlineſs was of the firſt conſequence: the patients were frequently waſhed all over with vinegar and water, accompanied with friction: a ſolution of muriate of ſoda was ſometimes made uſe of. Putrid ſtools were inſtantly removed, and the ſtench corrected. All unneceſſary apparel and furniture were removed.

But the moſt dependence was placed upon the *cold bath*, when the hot fit was on. This infallibly gave inſtant and aſtoniſhing relief, rendering the paroxyſms ſhorter and milder. It was applied either generally or locally, as the urgency of the caſe required: this was determined by the ſurface that appeared unuſually hot. When the heat was partial or local, a correſponding bath was uſed.

The cold bath was generally applied, by laying the patient naked upon a thick blanket, then ſprinkling him and the blanket with the coldeſt water: the wetted blanket was wrapped around him, and ſuffered to remain till it became warm; when it was thrown off, and ſprinkled a ſecond time; thus reducing the heat of the body to the ſtandard of health. The cold bath ſerved only till the criſis of the fever; afterwards it was as diſtreſſing and painful as heretofore it was invigorating and pleaſant. Many patients have been injured by a continuation of the bath after the criſis. Waſhing the hands and face in cold water was grateful.

When my fever formed a criſis, I did not know but the cold bath would be as uſeful as heretofore. When the hot fit came on, I ordered the nurſe to prepare the blanket, and ſprinkle me: the fit had proceeded to ſome length before we were in readineſs: the firſt daſh of water ſeemed to freeze every drop of blood in my veins, and chilled my bones to the very marrow. Never did I perceive ſo great a change in twenty-four hours, from the pleaſing and animating to the painful and diſtreſſing.

Bleeding did not produce that good effect which we had been taught to expect. I am ſupported in the opinion by phyſicians grown grey in the uſe of the lancet, that it was, in every inſtance, in all ſtages of the fever, *evidently injurious*. Neither was it found neceſſary to procure any ſudden evacuations; for *here* the diſeaſe ſcarcely terminated in the ſame number of weeks as hours at Philadelphia. Warm bathing was hurtful, except to the cold extremities.

Nitre, and other refrigerants and febrifuges had no laſting effect; opiates had not till after the criſis, neither had bark: this was now uſed with a liberal hand. A watery diarrhœa was the moſt troubleſome and pertinacious ſymptom.

The *chief indications* of cure, as delivered by my worthy friend Dr. Smith, in his courſe of lectures on the theory and practice of phyſic, are, to regulate the heat of the body according to the ſtandard of health, and ſupply the ſyſtem with ſuch ſubſtances as readily yield carbone.

To give an *impartial* hiſtory of the origin of the fever that prevailed in Hanover, and all the circumſtances which can be admitted as evidence of its having been brought from another place, or *generated* in this, I muſt firſt obſerve, that before the preſent ſeaſon, this fever had been wholly confined, in New-England, to the ſea-port towns, never having appeared in the country, nor within an hundred miles of this place; that none of the perſons who were firſt affected had viſited infected towns for the laſt ſix months preceding their attack, and many of them never had. It could not have been introduced by infected goods, for neither merchant nor his clerk had the diſeaſe. It appeared before the ſpring goods arrived, and as early as in other parts of the United States. It appeared in all thoſe country places about the ſame time. This evidence have we, to warrant us that we are not indebted to Boſton, Philadelphia, nor the Indies, for this fever.

On the other hand, it has generally firſt appeared in the moſt compact parts of our country towns, and in thoſe parts which have been moſt expoſed to putrefying animal and vegetable ſubſtances, where the houſes have been ſmall, and many perſons crowded together in the ſame room, where there has been a want of freſh air, cleanlineſs, &c.

At the ſouth end of the town of Hanover, where the fever made its firſt appearance, we were ſo unfortunate as to have the effluvia of a putrefying cow, and ſeveral leſſer animals, which lay within 150 feet of the main ſtreet, and about the ſame diſtance from No. 1 and 2. The effluvia of forty buſhels of potatoes muſt alſo be mentioned, which putrefied within twenty feet of the houſe No. 2, and leſs than forty from the main ſtreet. This houſe being ſmall and unfiniſhed, the weſt part open to the afternoon ſun, was uſed as a waſh-ſhed, and a receptacle of all kinds of kitchen filth: the ſoil being clay, the mould and upper ſtratum of clay retained all this filthy moiſture, which exhaled a deleterious gas, by the action of the afternoon ſun, which otherwiſe might have lain dormant.

The temple of Cloacina ſtood within thirty feet of the houſe. Here numbers of votaries had daily worſhipped that goddeſs for ſeveral years, and even without a vault. The temple ſtanding upon a ſouthern declivity, fronting the north, the ſun ſpent his whole force upon a large maſs of ordure, that emitted an odour fraught with death.*

* This gas is highly noxious, but may be deſtroyed by covering the cloaca with lime, which neutralizes the gas. I think it adviſable, in the

In June the family of the houſe No. 2 conſiſted of nine perſons, eight of whom took the fever; ſeven were among the firſt caſes: two died. The one who eſcaped left town before the diſeaſe made its appearance. Two other perſons, not of the family, who ſpent the day-time at No. 2, were affected. Three other perſons who became reſidents in this houſe ſuffered.

This is *evidence*, and evidence which I hold to be concluſive, that the diſeaſe *did originate* in Hanover, and in all the adjacent towns in which it appeared.

It now remains for me to aſſign a *cauſe* for this fever; but *cauſes are numerous as the ſtars, different as their magnitudes, and wide from the truth as the Ptolemaic hypotheſis.* But far from broaching a new hypotheſis, or *new vamping* an old cauſe, I ſhall cloſe my too lengthy diſſertation with ſome obſervations on putrid effluvia.

In thoſe caſes that terminated fatally there was an evident incipient mortification. If the corpſe had been ſuffered to go through all the ſtages of putrefaction above ground, *I am convinced*, that every perſon coming within its atmoſphere during its laſt ſtage, would infallibly have been affected by it. This deleterious gas cauſes the living fibre to commence the ſame action which gave riſe to itſelf, elſe how can we account for health, diſeaſe, death and putrefaction, in the ſhort ſpace of twelve hours, and in ſome caſes, report ſays, in leſs than three? Can this be conceived of, unleſs that which cauſes the diſeaſe cauſes the putrefaction alſo? for this does not commence for many days after violent or ſudden deaths.

Chemiſts and phyſiologiſts are agreed, that putrefactive effluvia have the power of cauſing putrefactive operations in all animal ſubſtances expoſed to their action.

ſummer ſeaſon, frequently to throw quantities of lime into every vault and place that emits putrid air.

ARTICLE III.

Obſervations on POT-ASH; *being an Inquiry how far the miſchievous Effects of Septic Acid are reſtrained by Pot-aſh, and other Alkalies, particularly in reſpect to the Effects of Septite of Pot-aſh (Nitre or Salt-Petre), upon Animal Fleſh intended to be eaten, and upon the Human Stomach. In a Letter from Dr.* MITCHILL *to Dr.* PRIESTLEY, *dated Plandome, May* 4, 1799.

ON a former occaſion (Medical Repoſitory, vol. ii. p. 236 & ſeq.) an attempt was made to ſhow that the *ſeptic* acid which is formed in certain putrefactive proceſſes, was materially different in its conſtitution and qualities from the *nitrous* acid, obtained by diſtillation from ſalt-petre. Since the compoſition of that piece, I have obſerved that JUNCKER, in his view of the doctrines of BECCHER and STAHL, (2 Conſpectus Chemiæ, p. 280.) is of the ſame opinion, declaring, that in whatever manner the work of ſeparating it from the putreſcent or other bodies with which it was naturally mingled, was undertaken, "ne micula tamen acidi nitroſi puri ſiſtitur," *not a particle of pure nitrous acid can be obtained.* And he warns his reader, that in the obſervations which he offers, he means that *ſpirit of nitre only*, which is liberated from its connection with an alkaline ſalt. On the native ſeptic acid, which is as he allows, furniſhed ſo largely by the animal kingdom, (p. 277.) and is by far the moſt active and intereſting form of oxygenated ſepton, JUNCKER, like moſt other writers, has ſaid ſcarcely any thing at all.

The highly deſtructive effects of this offſpring of putrefaction have been pointed out in detail in a former eſſay, (Medical Repoſitory, vol. i. p. 39—40.) in which it was obſerved, that certain ſubſtances, and among others, pot-aſh in particular, poſſeſſed a power to reſtrain and curb its ferocity. The neutral ſalt, formed by the union of this peſtilential acid, with the fixed vegetable alkali, is the ſalt-petre or nitre of the ſhops, and of commerce. Concerning the medicinal and economical qualities of this ſubſtance, it is manifeſt to me, there are many miſtakes yet prevalent, and they appear to be worthy of being pointed out and corrected.

The ſeptite of pot-aſh has been denominated a ſalt of many excellent qualities, a *ſal polychreſtus*; and a great phyſician once wiſhed, for the good of his profeſſion, there could be found *one* other remedy, ſo certain and ſteady in curing diſeaſes as nitre. It has likewiſe been termed an *antiphlogiſtic* remedy, good for all manner of inflammatory diſeaſes with phlogiſtic denſity of the blood, poſſeſſing fine attenuating powers, being in no wiſe acrimonious, and happily calculated to withſtand a putreſcent ſtate of the body. It has further been called a *refrigerant*, a *diuretic*, and *carminative*, and employed accordingly by thoſe preſcribers, who are influenced by the *nominal* efficacy of remedies.

Such are ſome of the ſuperlative effects aſcribed to this compound of the acid of peſtilence and pot-aſh; and, for a conſiderable time after I became acquainted with the miſchievous effects wrought occaſionally by the naked ſeptic acid, I remained in the belief, that the ſtrongeſt of the alkalies could hold it faſt and keep it intirely harmleſs. It, therefore, did not appear to me improbable, that the character of the compound of the two might, as in a multitude of other caſes, be exceedingly different from that of either the conſtituent acid or alkali.

But latterly I have been inclined to the opinion, that pot-aſh is capable of combination with oxygenated ſepton in different degrees; that is to ſay, ſepton before combining with the alkali, may have been united to *more* or *leſs* of oxygene; and alſo ſepton in any of its degrees of oxygenation, may be united with pot-aſh, in different proportions: in other words, the acid may *vary in its ſtrength*, and likewiſe, on every degree of ſtrength, may be united the alkali *in various proportion*. The *nitrum nitratum* deſcribed by the older chemiſts, is an example of pot-aſh *ſuperſaturated* with nitric acid, and, ſtrange to tell! has been extolled for its advantageous operation in ardent fevers, accompanied with thirſt and with a dry and foul tongue. I have ſtrong reaſon to think that there is a diſproportion between the acid and alkali in other forms of nitre, as I have known litmus-paper to be turned repeatedly reddiſh by a watery ſolution of ſalt-petre, the reſidue of a quantity, which was ſwallowed by miſtake, and which nearly deprived a man of his life. A ſet of correct experiments is wanting, to elucidate more completely this part of a very curious and highly important ſubject.

Be theſe things as they may, all experience ſhows, that the connection between ſeptic acid and pot-aſh is eaſy to diſſolve:

at leaſt, a portion of oxygene ſeparates very readily from the nitre. The experiment of reddening blood, by mixing powdered ſalt-petre with it, was known to *Hoffman*, and, I think, fairly evinces a partial decompoſition of the ſalt. It ſeems to have a ſimilar operation upon the reſidue of that fluid, in the fleſh of ſlaughtered animals; and the reddening of the lean and fibrous part of meat, is evidently owing to the oxygene attracted from the nitre.

But a heightening of colour is not the only effect which ſeptite of pot-aſh works upon proviſions ſprinkled with it. There are, in many meats, eſpecially of old animals, and of thoſe which have been a long time ſalted, a *toughneſs* and *hardneſs* which render them difficult to be cut and to be chewed. The ſeptic acid ſeems, in ſome degree, to be disjoined from the pot-aſh, and evidently aſſiſts in decompoſing, to a certain point, the vaſcular and fibrous ſtructure of the meat. The quantity of nitre generally put on is ſmall: was the proportion larger, the meat would be yet further diſorganized, and be rendered more *ſoft* and *tender*, almoſt even to *rottenneſs*. But the injurious effect of the nitre is prevented by the ſea-ſalt commonly mingled with it, in the manner, and upon the principle deſcribed in my "Obſervations on Soda." (Medical Repoſitory, vol. ii. p. 292 & ſeq.) The uſe of ſalt-pere then in curing proviſions is, to make them *reddiſh* and *tender*, and not to exerciſe an *antiſeptic* and *hardening* power, as the muriate of ſoda does.

With all theſe conſiderations before me, I entertained great doubts of the truth of thoſe fine things, told over and again, and copied by one writer from another, about the mildneſs and wholeſomeneſs of nitre, and of its wonderful effects as a calmer and ſoother of diſeaſes. It ſeemed very ſtrange to me, that the acid, which, before its union with pot-aſh, was capable of cauſing fevers, ſhould be ſo ſuddenly transformed, as, notwithſtanding the laxity of their coheſion, to cure ſuch diſeaſes immediately afterwards.

While I was conſidering theſe things, a caſe fell under my obſervation, which allowed me fully to witneſs the operation of this boaſted *cooler*, *carminative*, and *febrifuge*. It ſhows, beyond a doubt, that ſeptic acid, though coerced by pot-aſh, is, in ſome degree, ſeptic acid ſtill. Its native virulence does not, even then, wholly forſake it. Nitre ought to be ranked among the poiſons; for, in a ſufficient doſe, it is truly a poiſon. Though it may be adminiſtered in ſmall quantities, without

exciting terrible ſymptoms; it reſembles, in that reſpect, moſt other venomous ſubſtances, which can be ſwallowed without detriment, and even often with advantage, when their doſe is not too large. It is time for writers of Diſpenſatories, and on Materia Medica, to know the facts concerning nitre and its operation, and to publiſh them for the ſake of undeceiving their readers. Too long has the medical world been the dupe of idle and partial opinions on this ſubject. Read the following accident, and judge of what I have ſaid, from the ſymptoms induced by ſwallowing ſeptite of pot-aſh or ſalt-petre:

A cartman, of middle age, had followed his buſineſs, as uſual, on Saturday the twentieth day of April, 1799. On Sunday morning he determined to take a ſaline cathartic, for an indiſpoſition too trifling to require the advice of a phyſician. Accordingly, his wife diſſolved an ounce of what ſhe believed to be ſulphate of ſoda (Glauber's ſalts) in water, and gave it to him at a draught. He ſwallowed it. Soon after he was ſeverely incommoded by what he termed "a great weakneſs about his heart." Nauſea came on, and was followed by vomiting of the contents of the ſtomach, mixed with conſiderable quantities of blood at each time. His ſtrength was exceedingly impaired, and a ſenſation of coldneſs over the whole body was remarked by him, particularly in the extremities. I did not ſee him until after the bloody vomiting had continued, at times, for ſeveral hours, and then his pulſes at the wriſt were very ſlow. He was, however, quite rational, and ſaid he then felt much better than he had done. On examining what ſort of ſalt he had taken, for ſome cryſtals of it remained in a wide-mouthed bottle, I found it to be ſeptite of pot-aſh, (ſalt-petre.) This was about eleven o'clock before noon, and he had taken it at ſix in the morning. As it had had no purgative effect, I ordered him ſome caſtor-oil, and almond milk, ſweetened with ſugar, or ſome milk whey, and ſome water-gruel.

In 35 Commentar. de rebus, &c. p. 176, a caſe is mentioned of death from taking an ounce of nitre; and if a part of the quantity which this man took had not been vomited up, he probably would have died too. The ol. ricini purged him gently, and he gradually got better, but complained very much of weakneſs about the præcordia.

There are numerous other accidents not materially unlike theſe. Such occurrences give us no very favourable account of the benignity of nitre as a medicine. It is a pity that prac-

tiſers of phyſic do not better underſtand the component parts of their preſcriptions. How few know, that in adminiſtering nitre, their patients are made to ſwallow a portion of the naufeating and ſickening acid of putrefaction!

Poſſibly theſe remarks may have a tendency to remove the doubt contained in your letter of April 11, 1799. You will hereby perceive, that *my native acid of ſepton* is a combination of this baſis with oxygene and water, whereas your *artificial acid of nitre* undergoes a partial decompoſition by the heat of diſtillation, and is adulterated beſides with whatever happens to be mingled with it, during and after its combination with the vegetable fixed alkali; and both theſe forms of acid differ from atmoſpherical air, inaſmuch as the former are *chemical* mixtures, the latter is *mechanical*.

It would be better for ſcience, if the word "nitre" was rejected altogether from uſe. *Nitria*, whence the term comes, was, you know, a diſtrict of ancient Egypt, famous for the quantity of mineral alkali which it afforded. (D'Anvilles Geograph. Egypt.) This ſaline ſubſtance has thence been called by the names *nitrum*, *nitre*, &c. In confirmation of which, I obſerve in the Dictionary of CALLEPINUS, printed at Baſil, in 1538, that what they called *nitrum*, was a material employed to cleanſe clothes, and waſh the bodies which wore them. And S. BOCHART remarks, (1 Opera. Chanaan, lib. i. chap. 14.) that the ancients made a kind of ley from *aſhes*, *ſoda* and *bole (cinere, nitro et cimoliâ)*, for more effectually clearing their bodies from naſtineſs; when they bathed. I need not remark to you, that I employ the word "nitre," not in its ancient, but modern ſenſe.

It is highly deſirable, that ſome of our men, whoſe opinions have weight with the public, would peruſe the work of Lanciſi, phyſician to Pope Clement XI. on the noxious exhalations of marſhes. (De Nox. Palud. Effluviis.) By the perſevering and luminous reſearches of this great man, it was found, as long ago as the year 1716, that marſh-water, by ſimple diſtillation, (ibid. lib. i. cap. 12.) manifeſted an *acid* quality, and that *calcareous* ſtones (ibid. lib. ii. cap. 2.) were better for paving the ſtreets of cities than *ſiliceous* ones, becauſe the *alkaline nature* of the former was adapted to imbibe the noxious moiſture of the air, and ſweeten the *acid ſalts* with which it abounded. Indeed, much of the matter detailed by the writers of our days, on local ſources of diſtempers, may be found better obſerved, and better ſtated by Lanciſi, than in their writ-

ings. By the bye, I obſerve he mentions the Engliſh philoſopher MAYOW. (Ibid. lib. i. p. 1. chap. 2.)

If the philoſopher of Rome had reaſoned upon his own diſcovery, he could not have failed to draw the inference, that by *alkaline ſubſtances*, might the HYDRA of peſtilence be overcome.—As I have mentioned this monſter, I ſhall pauſe a little to give you my opinion of the allegory among the ancients concerning her; and I attempt the explanation the more willingly, as I believe *Lord Verulam* has ſaid nothing about it. The fable is this: In Peloponneſus, between Mycenæ and Argos,* there was a fen, or marſh, of ſome extent, called Lerna. This muddy and ſtagnating pool was inhabited by Hydra, a horrible and devouring monſter, with ſeveral heads; ſome ſay ſeven, others nine, and others fifty. The malignity of her poiſon was ſuch, that a wound from an arrow dipped into it was inſtantly mortal. She made dreadful havock among the people of the ſurrounding country, and devoured a great number of their ſheep and other cattle. In obedience to the orders of the tyrant Euryſteus, Hercules went to fight this deſtructive and formidable creature. On his approach, a crab came forth to the aſſiſtance of Hydra. But Hercules cruſhed the crab, and afterwards ſlew Hydra. Of the heads of Hydra, it was reported, when one was cut off two would ſprout from the wound, unleſs prevented by the immediate application of fire. Hercules availed himſelf of the aid of fire, and ſucceeded in his undertaking.—In the ninth figure of MONTFAUCON's 66th plate there is a figure of Hercules, with crabs near his feet, having, as the learned father curiouſly enough remarks, a relation to ſome myſtery which he does not comprehend. (1 Antiquity explained. Art. Hercules. Chap. ix.)

Now, it appears to me this is an allegory expreſſive of the peſtilential vapours emitted by the bog of Lerna, and of the means found, by experience, uſeful to drain off its ſtagnant water, and to clear the adjoining and ſurrounding moraſſes.

The word "hydra" is derived from ὑδῶρ, *water*. This fluid, then, detained upon the marſh of Lerna, favoured, occaſionally, the production of unwholeſome exhalations. Such vapours, being at once inviſible and injurious, were aſcribed to ſome preternatural enemy, or deſtructive monſter; and be-

* I know that in determining the place where the fen of Lerna exiſts I differ from that prince of geographers, d'ANVILLE, who has placed it nearer the Argolic gulf. As this is not material to the argument, I merely mention it.

ing diffuſed or wafted around the country, and oftentimes cutting off both man and beaſt, were fancied to be the effect of the ſuppoſed monſter's poiſon. According to their extent and virulence was ſhe reported to have fewer or more heads for preparing and inflicting this poiſon. The mere draining off the water, and leaving the mud and ſlime bare, was termed cutting off an head; and the increaſe of deleterious gaſes in conſequence of expoſing ſuch a naked ſurface, was aptly expreſſed by the ſprouting forth of two in its place. By cauterizing, or ſearing, was underſtood, either the ſolar heat in drying the ground after the water was drained away, or the burning up of the trees, ſhrubs and obſtacles, to free ventilation, by ordinary combuſtion, or perhaps both. The crab, who was Hydra's ally, perhaps does not refer to the ſun's place in the conſtellation Cancer, ſo much as to ſhow the frequent recurrence of the difficulties, and the ſuperior ſtrength and ſkill requiſite to overcome them. In the whole allegory "Hercules" may be underſtood to mean, "inſuperable courage and induſtry."—North-America, at the cloſe of the eighteenth century, wants a HERCULES.—This interpretation is confirmed by another conſideration, that the ancients had not only their *hydra*, who lived in the water, but their *Cherſydra*, who remained after the marſh or fen was dried up. *Cherſydra* being derived from the two words, χερσος, *land not fit for the plough*, and ὑδρα, *the monſter of the fens*, will thus mean the venomous and ſickly condition of the neighbouring atmoſphere after the water was exhaled, and the ground at the ſame time not rendered arable thereby, typified by a poiſonous ſerpent; and was thus expreſſive of the rage of peſtilential effluvia, which ſome times, and under certain circumſtances, continue in a virulent ſtate, in dry weather, near their dried ſources.

Hydra is ſeemingly mentioned by VIRGIL (Æn. 6. v. 576.) as a *fictitious* or *poetical* animal. BOCHART, however, with his uſual prodigious erudition, appears deſirous to make the whole ſtory *literally* intelligible (Hierozoici pars poſter. lib. iii. chap. 13.) But LANCISI, with a more clear and diſcriminating mind, perceives that important phyſical truths are concealed under this twofold allegory, and ſhows how they are to be unriddled. (De Nox. Palud. Effl. lib. i. p. 2. cap. 3.) In conſidering theſe matters, you will not fail to recollect, that the claſſical writers, and others, uſe the word "hydrus," as well as "hydra," and ſome of them apparently confound the two. The former noun of the maſculine gender is probably

the name of the *real* animal, the *water-ſnake*; the latter of the *imaginary* one. But of this enough.

If peſtilential matter, as I obſerved before, can be ſubdued by alkalies, then the formation of ſeptite of pot-aſh, in the alimentary canal, muſt be a very frequent and common proceſs. It is univerſally agreed, that peſtilential matter may be taken into the ſtomach by ſwallowing, and no reaſonable doubt can be entertained of its production, within that organ, and other parts of the inteſtinal tube, from the corrupted remains of food. The whole tenor of preſcription, as explained in my letter concerning the uſe of alkaline remedies in fevers, (Medical Repoſitory, vol. i. p. 265.) goes to ſhow, that the offending cauſe is of an acid quality, and, in its worſt forms, I think the acid engendered has ſepton for its baſis, ſince aliment, containing this principle only, is capable of yielding that moſt noxious compound. When ſeptic acid thus exiſts in the alimentary canal, and carbonates, tartrites, &c. of pot-aſh are taken down, the ſtronger acid is attracted, and a proportional quantity of nitre or ſalt-petre is formed. Thus, in abundance of caſes, the practiſers who are fond of preſcribing ſeptite of pot-aſh, might ſpare themſelves the trouble, as that ſaline compound is, in certain caſes, formed in the ſtomach and bowels in conſiderable quantity. What preciſe effect the *nitre ſo formed* has in the inteſtines, and on the conſtitution at large, deſerves to be inquired into with great care; for I am not without apprehenſion, that ſome of the ſad ſymptoms occaſionally attendant on fevers, are modified by the ſeptite of pot-aſh formed within the belly.

ARTICLE IV.

CASE *of* TETANUS *cured by* WINE. *Communicated in a Letter to Dr.* JAMES GREGORY, *Profeſſor of the Practice of Phyſic in the Univerſity of Edinburgh, by Dr.* DAVID HOSACK, *Profeſſor of Botany and Materia Medica in Columbia College.*

New-York, March 12, 1799.

THE treatment of lock-jaw by the uſe of *tonic remedies*, has been long ſince ſanctioned by the ſucceſsful practice of Dr. Cochran of Nevis, (ſee Med. Commentaries, vol. iii.)

Dr. Wright of Jamaica, (ſee Lond. Med. Obſ. and Inq. vol. vi.) Dr. Ruſh of Philadelphia, (ſee American Phil. Tranſactions) and Dr. Currie of Liverpool, (ſee Med. Mem. of London, vol. iii.) but the ſame treatment, in other hands, has not been equally ſucceſsful, inſomuch that it is ſtill conſidered as one of thoſe diſeaſes which generally baffle medical preſcription. To what cauſes is this failure to be aſcribed? Not to any defect in the principle upon which thoſe remedies have been preſcribed: the caſes which have been recorded of the ſucceſs of tonic medicines are too numerous to admit a doubt, that the proximate cauſe of lock-jaw conſiſts in an exhauſted ſtate of the ſenſorial power from violent irritation applied to the nervous ſyſtem: ſtimulants and tonics are, therefore, the remedies which are beſt calculated to reſtore this loſt energy. Their failure I have conſidered to proceed from the complicated and inert manner in which they have uſually been adminiſtered.

In the greater number of caſes which I have either witneſſed in practice, or remember to have ſeen deſcribed, the *bark*, *wine*, *cold-bath*, and, in many inſtances, *opium*, *muſk*, and *mercury*, have been exhibited at the ſame time: I muſt except one caſe, recorded by Dr. Currie, in the Memoirs of the Medical Society of London, in which, the patient rejecting the mixture of *bark* and *wine*, the bark was omitted, and the wine was employed alone, which ultimately effected a cure; but in this caſe, opium, mercury, and the cold and warm bath, had been previouſly employed, but to no purpoſe.

This complicated mode of practice cannot but be prejudicial in any diſeaſe; in lock-jaw it muſt eſpecially prove injurious, by harraſſing the patient, and by offending the ſtomach with the diſcordant and nauſeous mixture of the remedies above-mentioned: if, therefore, a practice more ſimple, and, at the ſame time, more efficacious can be deviſed, it is certainly a deſideratum in the treatment of this formidable and fatal diſeaſe.

Having, in a variety of diſeaſes, attended with great exhauſtion of the vital powers, employed wine alone, with ſucceſs, without the uſe of thoſe remedies which are uſually preſcribed in this condition of the body, I long ſince reſolved to give it a trial in lock-jaw.

In January, 1798, a merchant of this city, while engaged in opening a box of goods, ſtruck the inſide of his right-hand upon a nail; the ſkin was conſiderably torn, but the wound did not appear to extend beneath the integuments. In twenty-

four hours his hand became painful, and ſwelled, attended with great heat and redneſs, which ſpread over the wriſt. He immediately applied a poultice of bread and milk to the part affected. In forty-eight hours the pain extended the whole length of his arm, and produced ſome uneaſineſs about his throat, eſpecially in the act of chewing and ſwallowing. He became alarmed, and applied to me for advice. I found him in great pain; but being free from fever, I directed him to have recourſe to *wine*; to take a large wine-glaſs full every hour until his pain was removed; and, in addition to the uſe of wine, to apply a compreſs, wet with ſpirits, to the wound. When he had taken to the amount of four glaſſes, he felt himſelf very ſenſibly relieved; and by the occaſional uſe of the wine for twenty-four hours, his pains entirely left him; the ſwelling ſubſided, and, in a few days, the wound was healed, without any unpleaſant appearances.

What would have been the progreſs and termination of this caſe, had it been left to itſelf, is uncertain; but the immediate good effects of the treatment preſcribed encouraged me to make trial of the ſame remedy in a caſe where the diſeaſe might appear in a more formidable ſhape.

On Tueſday, March 13, 1798, about one o'clock P. M. I was called to viſit a mulatto ſervant woman of John Harrington, Eſq. of this city. I was informed that about an hour before, while engaged in waſhing clothes, ſhe had pricked herſelf with a pin in the wriſt of her right-arm. The part at which the pin entered was upon the inſide of the wriſt, immediately over the connection of the radius with the carpus.

The pin was inſtantly removed, and, finding no inconvenience from the accident, ſhe returned to her employment. In a ſhort time ſhe felt a great degree of foreneſs in the part which had been injured, with pain ſhooting occaſionally to the arm, ſhoulder and neck. Theſe ſymptoms, in a few minutes, were ſucceeded by ſtiffneſs about the throat, difficulty of ſwallowing, ſome interruption of her ſpeech, and, at length, a locked ſtate of the jaws, attended with a ſpaſmodic contraction of the muſcles at the back part of the neck, and occaſional ſubſultus tendinum, with ſome coldneſs of her extremities. In this ſituation I found her.

She was naturally of a delicate and irritable habit of body, and had been much ſubject to hyſterical complaints and fits of fainting, which were ſometimes induced by the moſt trifling cauſes. Her irritability of habit was alſo at this time proba-

bly increaſed, having but three months before borne a child, which ſhe was then ſuckling.

Although I have been long ſince convinced of the inſufficiency of opium in the cure of this diſeaſe, in the hurry of the moment I gave her about ſixty drops of laudanum, in a ſmall quantity of wine. Her jaws being cloſely locked, it was with great difficulty adminiſtered. In a few minutes after ſwallowing the laudanum ſhe ſickened at the ſtomach, and vomited violently, complaining at the ſame time of great pain and diſtreſs at the pit of her ſtomach. The anodyne draught was entirely rejected; but, upon a moment's reflection, I did not regret this circumſtance, as the diſeaſe aſſumed a very decided character, and I had made up my mind to rely upon the effects of wine alone, without the aſſiſtance of any other remedy: accordingly, about two o'clock, I directed a large wine-glaſs full of *Madeira wine* (the glaſs containing about two ounces), to be given punctually every hour, and a cup of ſago, or panado, with wine, to be given, from time to time, as her nouriſhment. At this time another phyſician, who had alſo been called upon at the time of the accident, arrived. I related to him what had been done, and the mode of treatment which I directed for the patient. This gentleman having had frequent opportunities of ſeeing this diſeaſe, and having frequently witneſſed the failure of the ordinary mode of treatment, he at once, with great candour, acceded to the plan propoſed, and, in addition to the uſe of wine, propoſed the application of cauſtic to the part which had been wounded. Accordingly the wound was freely pencilled with the lunar cauſtic, and afterwards covered with a poultice of bread and milk, with the view to obtain ſuppuration as ſoon as poſſible.

The wine was adminiſtered with great fidelity by the mother of the patient, until about five o'clock the next morning. She had ſome ſlight convulſions in the courſe of the afternoon, but they were more of an hyſterical ſort, induced by her great anxiety of mind, than to be aſcribed to the diſeaſe itſelf. Generally ſpeaking, there had been a very manifeſt abatement in all her ſymptoms, and ſhe had paſſed a more comfortable night than could have been expected. At five o'clock on Wedneſday morning, her miſtreſs, alarmed at the quantity of wine ſhe had taken, deſiſted from its further uſe. From this time, appearances became more unfavourable, and at eight o'clock her jaws, which had been relaxed during the plentiful uſe of wine, again became ſtiff and cloſed. We ſaw her at nine, and im-

mediately gave her about half a pint of wine, and ordered it to be adminiſtered as before. At one her ſymptoms were greatly changed; we found her ſitting up in bed, eating ſmall portions of roaſted oyſters, which ſhe had called for. At this time her jaws were almoſt in their natural ſtate. She had taken her wine punctually as directed, but experienced no inconvenience from it whatever, although in health ſhe had not been accuſtomed to its uſe. Her pulſes were ſtill ſmall and feeble, without any excitement from the uſe of wine. The heat of body remained at its natural ſtandard, but not at all increaſed. The pain in her head was abated, but without any appearance of ſuppuration. Finding this mode of treatment to agree ſo well with her, we directed it to be continued. We ſaw her again in the evening; her ſymptoms ſtill continued favourable, without the ſmalleſt febrile action from the uſe of wine. Having had no diſcharge from her bowels ſince her illneſs, an injection was adminiſtered; which remedy was afterwads employed from time to time in the courſe of her diſeaſe, whenever the ſtate of her bowels required it. The wine was continued through the night: ſhe ſlept, altogether, about three hours in the courſe of the night; and took freely of her panado.

Thurſday morning at nine o'clock, her complaints appeared to be, in a great meaſure, ſubdued; inſomuch that we did not think it neceſſary to viſit her again until late in the evening, and directed the wine to be given at longer intervals, and the quantity to be leſſened.

She remained in a very comfortable condition until the afternoon—the *pain in her hand returned* with violence, extending to her arm and neck as before—her jaws were again cloſed—the rigidity of the muſcles at the back of her neck returned—her mind became greatly agitated—ſhe again complained of diſtreſs at the pit of her ſtomach—ſhe fainted, and had ſeveral ſlight convulſions. Being called at that time, I gave her, with ſome difficulty, about half a pint of wine, and ordered a warm poultice to be immediately boiled. When prepared, I poured upon the ſurface of it, half an ounce of laudanum, and applied it to the wound. Her ſymptoms were in a ſhort time allayed: I left her, directing the wine to be continued as before, a large wine-glaſs full every hour.

We ſaw her again at nine in the evening. She remained tranquil—her jaws were leſs firmly cloſed, but the pain in her hand was not altogether removed. Although ſhe had taken the wine punctually as directed, it had not produced the

leaſt apparent excitement. Having had no diſcharge from her bowels for the laſt twenty-four hours, an injection was adminiſtered. The anodyne poultice was renewed; and, in addition to this application, we directed her arm to be bathed with laudanum occaſionally through the night.

Friday morning we found ſhe had paſſed a more comfortable night than the laſt; had taken her wine every hour; her jaws were perfectly relaxed; the pain in her hand had greatly abated, and ſhe was enabled to extend her fingers at pleaſure, which ſhe could not do before. Her pulſes and ſkin were natural; her appetite unimpaired; her mind compoſed, without any inconvenience from the wine. We directed her remedies to be all continued as before, fearing leaſt any alteration might ſubject her to a return of her complaints.

In the evening we obſerved the wine had exhilarated her ſpirits; ſhe became very talkative; her pulſes became full, and free from all tenſion; her ſkin was ſomewhat heated, and all complaints removed except the wound at the wriſt, which exhibited a healthy appearance, and was entirely free from pain, but without any ſign of ſuppuration.

We directed the wine to be adminiſtered through the night, but in ſmaller quantities and at longer intervals, unleſs her complaints ſhould return and demand a continuance of it as before.

Saturday morning we were informed ſhe had ſlept the greater part of the night, and had taken but a ſmall quantity of wine; her ſymptoms being, in all reſpects, favourable, the wine was diſcontinued, except a ſmall quantity mixed with nouriſhment. A dreſſing, of ſimple ointment, was applied to the wound. From that time ſhe remained free from any return of her complaints, and has ſince been in perfect health.

Upon calculating the quantity of wine which ſhe had taken, it amounted to three gallons.

ARTICLE V.

The following Remarks on the CONSTITUTION *of* NITROUS AIR *(Septic Gas) are from an anonymous Correſpondent, and addreſſed to Profeſſor* MITCHILL.

DEAR SIR, *Philadelphia, Jan.* 15, 1799.

THE ſubject to which I now wiſh to call your attention is one which, perhaps, has already engaged much of your time, but which, I hope, you will not heſitate to examine again. I mean the nature of that ſubſtance called nitrous air. As long ſince as the famous experiment of Mr. Cavendiſh on the formation of the nitrous acid, and thoſe of the French chemiſts, the nature and properties of nitrous air have remained in much obſcurity, and its relation to other ſubſtances has not been thoroughly examined. You will, therefore, pardon the liberty I aſſume in forwarding ſome hints towards the developement of this intereſting ſubject.

In what manner is nitrous air conſtituted? or what gives exiſtence to that elaſtic fluid which is generated during the action of the diluted nitric acid upon ſome metals? I anſwer, by a true *chemical union* of nitrogen gas with pure air; or, to ſpeak more definitely, the volatilization of thoſe two principles in their original *combined ſtate* in the acid, although in altered proportions to each other, by an addition of heat to them. The manner in which this ſeems to be produced, I will endeavour to explain briefly in the end. This particular union of theſe two elementary principles, forms an exceeding mild or weak nitrous acid. This we prove from the effect it produces upon ſome blue vegetable dyes in changing them to a red colour, as is aſſerted by M. Fourcroy. This, however, is not produced in a few days, as a conſiderable time is required to effect it. Nitrous air may then be ſaid to be of equal ſtrength with the common nitrous acid, diluted by water to that degree in which its ſour taſte is imperceptible, and in which it will ſtill redden a blue vegetable, in the ſame ſpace of time in which the air uſually does. This dilution will enfeeble and lower the powers of the nitrous acid very much indeed; yet ſtill I maintain the compariſon to be juſt; and what is

more, these two substances, the same in quality, differ only in form.

I would infer the union of nitrogen gas, and pure air in the composition of nitrous air, to be a *chemical one*, and of course the compound differing materially from the separate principles. *First*, from the fact, that a quantity of oxygenous gas, added to nitrous air, suddenly combines with it, by being absorbed by it, and forming the nitrous acid. This simple experiment favours the above idea with respect to the nature of the union of the component parts of nitrous air, in as much as all preternaturally weak acids have a strong tendency to combine with fresh oxygene, in order to acquire their natural strength. By the natural strength of an acid, I would mean that degree of acidity which it will always acquire when exposed, for a sufficient length of time, to a quantity of unadulterated atmospheric air. Thus the most highly concentrated acids are diminished, and such as contain little oxygene, united to large basis, are increased in their properties by exposure. This is amply evinced in the generality of the mineral acids, and in those of the vegetable kind.

Secondly. The opinion I have mentioned appears to be ably supported by the following consideration. The simple addition of pure air to nitrogen gas, even in the exact proportion in which they are said to form the nitrous air, will not afford a compound which possesses one of the properties of an acid, except it be the carbonic, which it resembles only in its aëriform property: for, were the case otherwise, we should always form the nitrous acid in our laboratories, and the atmosphere itself would be a substance of that nature. We, therefore, can say no more when we bring these two airs into contact, than that they are only in a state of mixture, and that no chemical union has ensued. But when we have recourse to some agents, we affect a more intimate union, and circumstances very different from these make their appearance. Thus, when the electric spark is made to pass through them, under certain proportions to each other, instead of the phenomena observed in merely adding the one to the other, as was just hinted, we behold, with astonishment, a complete change produced; and what we could have breathed before with impunity, and even with advantage, is now converted into a substance capable of corroding our flesh, and of dissolving some of the hardest metals—namely, the nitrous acid, or common *aqua fortis* of the shops. What are we to deduce from this wonder-

ful preſentation, but that, in the firſt inſtance, the airs were only *mixed*, and that, in the latter, they were thrown into a ſtate of *combination*, by the unknown power with which the electric matter was endowed—cauſing them to embrace each other more intimately, and by their mutual or ſuperior actions, to generate a diſtinct ſubſtance?

Thirdly. We deduce the preſent opinion from the two following experiments. 1. Take known quantities of nitrous air and oxygenous gas; add the latter to the former, and the nitrous acid will be immediately formed in red vapours, which are ſoon abſorbed, giving a diminution in the bulk of the air, exactly proportioned to the acid produced. 2. Add a quantity of pure air to a mixture of nitrogen gas and vital air, and no alteration will be produced, the bulk of the mixture being multiplied according to the pure air added, and the original tranſparency retained. Take even the ſame quantity of pure air which was uſed in the firſt experiment, and a quantity of nitrogen and oxygene gaſes, in bulk equal to the nitrous air, and proportioned to each other in which they form it; add theſe together, and you will not perceive any change take place. Now, in theſe two experiments we have eſſentially the ſame materials; yet how different is the reſult of the former from that of the latter! Had the affinity which ſubſiſted between the component parts of the one been the ſame with that between thoſe of the other, ſurely the ſame phenomena would have ſhown themſelves in both, as the ſame cauſes, under ſimilar circumſtances, invariably produce the ſame effects. As this great law in philoſophy was not exerted in theſe two experiments, we hence conclude, that the circumſtances in each were different, and that this difference conſiſted in that which is admitted in common acceptation by the terms *mixture* and *combination*.

Fourthly. We may infer that nitrous air differs materially from the ſimple mixture of pure air and nitrogen gas, its conſtituent principles, in as much as the one is much more abſorbed by water than the other. According to an experiment of Dr. Prieſtley, mentioned in his firſt volume, nineteen-twentieths of nitrous air were abſorbed by water which was previouſly well boiled. On the other hand, we know that pure air is very little or not at all abſorbed by water. In what manner nitrogen gas is abſorbed by water I am not qualified to determine; but, from experience I can aſſert, that atmoſpheric air was only abſorbed by boiled water one-ſeventh of

the whole quantity uſed. The experiment in which this was aſcertained, was continued about as long as that of Dr. Prieſtley, which was ſome time more than what is commonly conſumed in abſorbing fixed air by water. In this view of the ſubject you will obſerve a ſtriking difference.

Fifthly. We are at liberty to draw the above concluſion alſo from analogy. For inſtance, who will deny that the oxygenated muriatic acid gas depends entirely upon a combination of its component parts? If oxygene and hydrogene, according to Girtanner, compoſe the common muriatic acid, and this acid is converted into a ſuperoxygenated ſtate, from whence we procure the above mentioned gas, no perſon can aſſert, with truth on his ſide, that this ſame gas is only a mixture of its two principles; becauſe the oxygenated muriatic acid gas effervesces ſlightly with ammoniac, inflames the regulus of antimony, and ſeveral other metals under certain forms; whereas, in the ſimple mixture of oxygene and hydrogene, we obſerve no ſuch thing at all. We therefore ſay, that this oxygenated muriatic acid gas is merely a volatilization of a great quantity of oxygene, in an original combination with a ſmall quantity of the baſe of the acid from which we procure it; and, in this, we obſerve its analogy to nitrous air, whoſe conſtitution is ſupported by a combination of its parts, and, in this particular, differs from the ſame parts exiſting in a mixed ſtate. The ſame thing is applicable to the ſulphureous acid gas, &c.

Sixthly. Every chemiſt believing, that the nitrous acid depends upon ſome peculiar ſtate of its component principles, which ſtate is defined by the term *combination*, I will, in the laſt place, conclude the preſent opinion with reſpect to the nitrous air to be juſt, from the fact of volatilizing the nitrous acid, by means of a certain degree of heat, ſo as to afford as permanent gas ſimilar in every reſpect to nitrous air. Now, no chemiſt will aſſert, that the heat in this inſtance deſtroys the combination of the two principles of the acid.

Having gone thus far into the preſent ſubject, I will detain you a little longer in endeavouring to anſwer one or two objections to this doctrine I have attempted to prove. It is ſaid, that the nitrous air can be decompoſed in the ſame manner in which atmoſpheric air is, and that, therefore, the connection which ſubſiſts between the conſtituent principles of each, is the ſame in both. But this argues nothing, as the nitrous acid is decompoſed in the ſame way; and yet who will ſay the com-

ponent parts of this acid were not chemically united? And this circumſtance can be explained in no other way than upon the principle of elective attraction, in which it is ſaid, the oxygene of the acid has a greater affinity to the inflammable body than it had to the nitrogene, which it forſook in order to form a new compound. In like manner we obſerve, in the decompoſition of the nitrous air, the ſame attraction between its oxygene and the inflammable body deſtroying its exiſtence.

It is ſaid, moreover, that nitrous air cannot be an acid, becauſe it appears under the form of an elaſtic, inviſible fluid, differing materially on that account from the acid which afforded it. But this is no objection at all from what has been ſaid, as well as that fixed air is liable to the ſame diſpute, which no perſon now doubts of being a real acid. But I ſhall explain the cauſe of it thus: When the nitrous acid is decompoſed upon any metal, a great portion of its oxygene is ſeparated from it by a ſuperior affinity, which goes to calcine the metal, whilſt its nitrogene and the remaining oxygene are diſſipated in the form of air by the acceſſion of caloric to them. But this air ſtill retains its original ſtate, being only a volatilization of part of the acid, and the metal is more or leſs oxyded, according to a variety of circumſtances. Hence we ſee, that all the oxygene which is neceſſary to oxyde the metal will remain fixed in it, which is always different in quantity, in different metals, and even in the ſame metal at different times. This, at once, explains the cauſe of failure in the uſe of the eudiometer, in aſcertaining the exact degree of purity in air, which ariſes ſolely from the impoſſibility of obtaining nitrous air at different times of equal ſtrength; as the metal becomes oxyded, according to the degree of heat applied, as likewiſe to the ſpecific gravity of the air induced, and alſo to the nature of the metal uſed. I ſubſcribe, with pleaſure, your humble ſervant, &c.

☞ *Future Communications from this gentleman will be very acceptable to the Editors.*

ARTICLE VI.

A MEDICAL CASE, *drawn up by Mr.* BERRINGTON, *of Great-Britain: Communicated by Dr.* PRIESTLEY, *in a Letter dated Northumberland, January* 10, 1799.

A LADY having received her linen from the waſh, as ſoon as ſhe made uſe of it, perceived from it a diſagreeable ſmell, and ſomething that ſeemed to get into her ſtomach, affecting the ſtomach and throat very unpleaſantly: ſhe continued to put on other things, the ſame effects following; and, on the ſecond or third night, ſhe experienced, after being in bed a ſhort time, a great ſhivering, which was followed by a profuſe ſweat that laſted till morning. Her throat, from this time, became dry, her lips parched, attended by a ſmall ſwelling in the glands of the throat; when ſhe drank any thing ſtronger than water, it cauſed an immediate burning in the ſtomach; and, at intervals, ſhe had the taſte of braſs, followed by a diſcharge of water from her mouth. It was now thought proper to have every article again waſhed; but they returned in the ſame ſtate of infection, producing, in the ſame degree, the ſame effects as they came in contact with the body. The linen was then expoſed to the air, night and day, during a whole week in the month of February laſt, when the froſt every night was ſevere, and the heat of the ſun every day was great; ſtill the diſagreeable ſmell continued. It was next buried, during ſome days, in the earth, but no ſenſible change ſeemed to be made, the lady, from what ſhe had before worn, continuing to experience the ſame night ſweats, and all the other effects, which were always ſtrongeſt when in bed, and when ſhe approached the fire. Recourſe was had to medical aid, but without effect, and the waſherwoman and all the waſhing ingredients and veſſels were examined without diſcovering any thing: ſhe had before waſhed for the ſame lady, and ſhe continued to waſh for other perſons, and no complaints were made.

A young woman ſervant in the family, in perfect health, of a conſtitution apparently quite different from that of the lady, was now eaſily induced to put on ſome of the linen, after it had been more than once waſhed, and ſubmitted to the

proceſs above-mentioned. The firſt thing ſhe tried was a neckerchief; when, immediately, ſhe had the ſame ſenſations in her throat and ſtomach, increaſing the nearer ſhe went to the fire; ſhe then boldly put on a ſhift (which the lady had never done but once for about half an hour), and went to bed. Her ſenſations during the night were exceſſive, being the ſame, in a much ſtronger degree, as thoſe already deſcribed; however, the young woman perſevered, and twice more ſlept in the ſame infected coverings: ſhe was now fairly in for it; every night ſhe experienced moſt copious ſweats, ſhiverings, and burnings at the ſtomach; and, during the day, the dryneſs in the throat, ſwelling about the glands, parched lips, a perpetual thirſt, with an inability, without cauſing an immediate burning in her ſtomach, to ſwallow any thing but water, and a conſtant head-ache, or, as ſhe deſcribed it, an inceſſant painful preſſure over the eye-brows. As the weather became warmer, all theſe ſenſations and effects became more evident, and, after the lapſe of four months, the young woman thus deſcribes herſelf: At night ſhe has the ſame burnings and ſweats; by day, at certain intervals of three or four hours, ſhe feels a burning at her ſtomach, which is followed by a braſſy taſte in her mouth, that goes off with a copious diſcharge of clear water. The warmer the day, the more frequent and ſtrong theſe returns are; but the moment ſhe expoſes herſelf to the ſun, the internal burning comes on and continues, relieved, however, by every cloud that intercepts the ſun's rays. On the 10th of June ſhe deſcribed to me this to be her ſtate.

I muſt obſerve, that during the whole proceſs neither the lady nor the young woman, though ſo diſagreeably affected, experienced any loſs of appetite or diminution of bodily ſtrength, nor did the pulſe indicate any fever.

The lady, who was on a viſit, finding it impoſſible to get out of the infection (which was communicated from one thing to another by contact) returned to her own home, but ſhe left behind her a copious maſs of contagious matter in the towels and ſheets ſhe had made uſe of; and theſe, it ſeems, have propagated the evil. The linen alſo which the young woman wears, or ſleeps in, by receiving infection from her body, keeps up and ſpreads the evil. A few weeks ago, I myſelf receiving a hand towel, ſmelt in it ſomething diſagreeable, which the young woman immediately explained to be the infallible ſymptom of the preſence of the evil. Before this, I had never been able to diſtinguiſh the ſmell ſo much complained of. I uſed the towel,

however; and, by way of experiment on myself, rubbed my arms and neck more than usual. In the course of the day I felt myself unpleasantly affected, at night sweated much more than common, and the next morning rose with a great dryness in the throat, accompanied by thirst and the painful pressure over my eyes. It went off, but I repeated the same experiment twice with other towels, and experienced precisely the same effects.

The fact, however extraordinary it may seem, being thus ascertained by a series of effects in three different persons, during the lapse of four months, and still continuing, the question to be resolved is, What substance, animal, vegetable, or mineral, is there that can, in the manner above described, attach itself to linen, and through it produce such powerful effects on the human body, and not be itself removable from the linen by the common means of washing, or the other means that were made use of?

June 20, 1798.

ARTICLE VII.

On the EXPANSION *of* WATER *during* CONGELATION: *Communicated in a Letter from* STEPHEN DICKSON, *M. D. to Dr.* MITCHILL.

IT is well known, that water, in the act of freezing, expands with considerable force. By calculations instituted on some experiments of the Florentine academicians, this force appears to be so great, as, in a spherule of water, only one inch in diameter, to be superior to a resistance of thirteen tons and an half.

Some ingenious experiments on this subject were made, a few years ago, in Quebec, during a very cold season, by Major Williams. He exposed to intense cold, water enclosed in an iron bomb-shell: the fuze was expelled to a considerable distance, and a cylinder of crystallized ice was shot forth from the aperture, which, by Dr. Hutton's calculation,* in

* Trans. R. Soc. Edin. vol. ii.

one inſtance, amounted to upwards of an eighteenth part of its original bulk.

The philoſopher who obſerves that this is not the uniform effort of ſpecific particles mutually receding from one another, ſince the ſpecific gravity of ice is greater than that of water, naturally inquires to what cauſe it is to be attributed. None ſeems to have a greater appearance of veriſimilitude than the ſuggeſtion of Dr. Black; viz. that, in the moment of the converſion of water into ice, the latent heat ſet looſe enters into the air contiguous to, or combined with the water, and expands it with ſuch vehemence as to effect the divarication of the ice into irregular maſſes, and the exploſion of reſiſting bodies. This explanation is countenanced by a minuter attention to the experiments to which it is applied; for we find that ordinary rain-water was employed, and even that the bomb-ſhells were but "nearly filled."

To put the inquiry, however, to a more rigid teſt, I procured two exactly equal and ſimilar cylinders of tin, cloſed at the extremities, except by a ſmall pipe in each iſſuing from the upper ſurface. One of theſe I filled with pure but ordinary rain-water; the other with water which I had carefully diſtilled. The apertures of both were cloſed alike by well fitted plugs of wood, which I had previouſly boiled in oil. I expoſed them to the open air, on the ſurface of the ſnow, in Quebec, the night of the 5th of January, 1799, when the thermometer ſtood at 28 degrees below zero of Fahrenheit's ſcale. About twenty minutes afterwards I found both the cylinders inclining to the horizon at an angle of about thirteen degrees, being ſo far rent from their baſes, which yet reſted on the ſnow. The intermediate ſpace in each was filled with rude maſſes of ice, which, on being examined with the microſcope (in a room), appeared to be compoſed of cryſtals, chiefly in the form of parallelopipeds and truncated pyramids. The whole of the appearances, in both caſes, were exactly ſimilar. I afterwards repeated theſe experiments, without any variety in the reſult.

From hence we perceive, evidently, that Dr. Black's ſolution is inadequate to account for theſe remarkable phenomena. At the ſame time I think it impoſſible not to admit the original principles upon which his ingenious rationale reſts. It is impoſſible that water can be converted into ice without the evolution of one-tenth of the whole quantity of its ſpecific fire, which is equal to 146 degrees of Fahrenheit's thermometer.

Now we know that water can be converted into vapour, under particular circumſtances, by much inferior temperature.—*Quere.* Muſt not part of the water have been converted into vapour in the very proceſs of congelation; and may not this cauſe be adequate to the production of the moſt violent expanſive force of froſt?

Quebec, January 24, 1799.

ARTICLE VIII.

OBSERVATIONS *on* METEOROLOGICAL INSTRUMENTS, *and on the* WEATHER *at Londonderry, in the Year* 1797. *By* WILLIAM PATTERSON, *M. D. Communicated in a Letter to Dr.* MILLER.

JANUARY.

Barometer	higheſt	30.53	9th. wind S. eaſy breeze, fair.
	loweſt	24.25	13th. wind variable, rain.
Thermometer	higheſt	48.	20th. wind W. moderate, fair.
	loweſt	36.	15th. wind fair, and froſt.
Hygrometer	higheſt	50¾	20th.
	loweſt	46½	10th. wind E. moderate, fair, but ſnow.

Rain 2 inches .364,585 parts.

FEBRUARY.

Barometer	higheſt	30.43	9th. wind S. eaſy breeze, fair.
	loweſt	29.55	14th. wind N. W. freſh breeze, rain, ſnow and hail.
Thermometer	higheſt	52.	22d. wind S. eaſy breeze, fair, bright and warm.
	loweſt	35.	15th. wind N. moderate, rain and froſt.
Hygrometer	higheſt	50.	9th.
	loweſt	35¼	16th. wind W. eaſy breeze, fair.

Rain 0 inches .827,585 parts.

MARCH.

Barometer	higheſt	30.38	21ſt. wind S. E. eaſy breeze, fair, hazy.
	loweſt	29.38	26th. wind variable, ſhowery.

Thermometer	higheſt	52.	31ſt. wind W. eaſy breeze, do.
	loweſt	36½	13th. wind N. eaſy breeze, fair, froſt and hazy.
Hygrometer	higheſt	44¾	24th. wind S. E. moderate, wet
	loweſt	36.	29th. wind W. eaſy breeze, rain.

Rain 2 inches .114,957 parts.

APRIL.

Barometer	higheſt	30.28	9th. wind N. E. freſh breeze, fair.
	loweſt	29.30	2d. wind N. W. moderate, ſhowery
Thermometer	higheſt	55.	24th. wind W. freſh breeze, do.
	loweſt	42.	2d.
Hygrometer	higheſt	41½	12th. wind S. W. moderate, rain.
	loweſt	27.	20th. wind E. freſh breeze, fair and bright.

Rain 1 inch .353,061 parts.

MAY.

Barometer	higheſt	30.18	9th. wind E. freſh breeeze, fair and bright.
	loweſt	29.24	4th. wind W. moderate, wet day.
Thermometer	higheſt	68.	25th. wind S. and S. W. moderate, ſhowery.
	loweſt	45.	12th. wind N. E. moderate, rain.
Hygrometer	higheſt	33⅔	5th. wind N. W. freſh breeze, rain and hail.
	loweſt	25⅓	25th.

Rain 3 inches .087,090 parts.

JUNE.

Barometer	higheſt	30.14	26th. wind N. moderate, fair and bright.
	loweſt	29.62	3d. wind N. W. freſh breeze, ſhowery and hail.
Thermometer	higheſt	60.	25th. wind N. E. freſh breeze, fair, and bright.
	loweſt	51.	3d.
Hygrometer	higheſt	35.	22d. wind N. E. moderate, ſhowers.
	loweſt	27.	29th. wind N. freſh, breeze, fair.

Rain 1 inch .418,751 parts.

JULY.

Barometer	higheſt	30.23	9th. wind W. eaſy breeze, little rain.
	loweſt	29.54	6th. wind N. W. moderate, ſhowers.

Thermometer	higheſt 72.	16th.	wind S. moderate, fair.
	loweſt 58.	6th.	
Hygrometer	higheſt 34⅓	8th.	wind N. W. eaſy breeze, rain.
	loweſt 30.	13th.	wind S. W. freſh breeze, do.

Rain 2 inches .417,105 parts.

AUGUST.

Barometer	higheſt 30.14.	22d.	wind W. eaſy breeze, rain.
	loweſt 29.38	8th.	wind S. W. eaſy breeze, do.
Thermometer	higheſt 64.	19th.	wind W. moderate breeze, ſhowers.
	loweſt 50.	18th.	wind S. E. freſh breeze, rain.
Hygrometer	higheſt 35.	9th.	wind S. W. eaſy breeze, ſhowers.
	loweſt 33¼	22d.	

Rain 3 inches .651,957 parts.

SEPTEMBER.

Barometer	higheſt 30.8	4th.	wind W. by S. eaſy breeze, ſhowery.
	loweſt. 29.22	20th.	wind N. W. moderate, do.
Thermometer	higheſt 58.	27th.	wind S. moderate breeze, fair but hazy.
	loweſt 50.	21ſt.	wind N. W. moderate breeze, ſhowery.
Hygrometer	higheſt 36½	21ſt.	wind N. W. do. do.
	loweſt 33½	4th.	

Rain 4 inches .256,255 parts.

OCTOBER.

Barometer	higheſt 30.37	10th.	wind N. W. moderate, rain.
	loweſt 29.44	18th.	wind W. by N. moderate, much rain.
Thermometer	higheſt 51.	10th.	
	loweſt 42.	4th.	wind N. E. moderate, wet, and hail.
Hygrometer	higheſt 37½	4th.	
	loweſt 35⅔	19th.	wind N. moderate, rain, and hail.

Rain 3 inches .822,726 parts.

NOVEMBER.

Barometer	higheſt 30.39	16th.	wind W. moderate, ſome rain.
	loweſt 29.44	30th.	wind S. E. moderate, ſnow, and rain.

Thermometer	higheſt	54.	10th. wind S. E. calm, fair, and froſt.
	loweſt	30.	24th. wind S.E. eaſy breeze, fair and froſt.
Hygrometer	higheſt	38½	30th.
	loweſt	35.	10th.

DECEMBER.

Barometer	higheſt	30.40	27th. wind W. moderate breeze, ſhowers.
	loweſt	28.80	1ſt. wind S. E. rain, and ſnow.
Thermometer	higheſt	46.	18th. wind S. freſh breeze, rain.
	loweſt	33½	3d. wind W. eaſy breeze, fair and froſt.
Hygrometer	higheſt	41¾	27th.
	loweſt	38½	3d.

November and December. Rain 5 inches .5,172 parts.
Total rain 30 inches .821,272 parts, in 1797.

The barometer, which is an upright one, with a floating gauge and a Nonius ſcale, is ſuſpended in an apartment in an upper ſtory, where fires are very ſeldom burned; the thermometer is one on Fahrenheit's ſcale; the hygrometer is made according to De Luc's plan, with a very thin ſtrip of tranſverſe whalebone, which moves an index round a circular plate, graduated to one hundred; the higher number indicating the greater degree of moiſtneſs of the air. With this hygrometer, I have obſerved eight years; and the obſervations are the more valuable, as being made with a comparable inſtrument. The thermometer and hygrometer, for the moſt part, are ſtationed in a lever-boarded window, which fronts the north-eaſt, and which is ſhaded on the outſide by a deal-board frame. The obſervations, when made twice a day, are made chiefly at 9 A. M. and at 3 P. M.; frequently they are made only once a day, and this ſometimes in the morning, and ſometimes in the evening, juſt as profeſſional avocations will admit; but, upon the whole, they are made ſo often as to aſcertain the temperature of the place pretty accurately, and the other ſtates of the air, viz. its weight and dryneſs, with ſtill greater exactneſs.

The rain-gauge is on a very ſimple conſtruction, conſiſting of nothing more than a funnel and a receiver. The funnel is made of tin; and its aperture contains an area of one hundred and forty-four ſquare inches. To the edge of the fun-

nel is foldered a perpendicular rim, an inch broad, and of the fame area as the aperture at the edge. The water collected in the receiver is generally meafured once a month, in pounds troy, which are reduced to cubic inches without the trouble of figures, by looking at a table, formed for the purpofe by Mr. Kirwan, and publifhed in the 5th vol. of Tranfact. Irifh Academy.

The wind is obferved by means of a vane attached to the cupola of our Exchange, which is fituated in the centre of the city, in an elevated fituation.

Account of the Weather at Londonderry in the Year 1797.

Months.	Prevailing winds.	Fair days.	Showery.	Wet.	Total.	Hail.	Snow.	Froft.	LunarHalo	Aur. Borea.	Thunder.
January,	W.	12	17	2	31	0	2	6	1	0	0
February,	S.	18	10	0	28	2	2	6	0	0	0
March,	S.E.	16	13	2	31	1	0	3	0	1	0
April,	W.	13	14	3	30	3	1	0	0	1	0
May,	S.	8	16	7	31	6	0	0	0	0	0
June,	N.W.	14	16	0	30	1	0	0	0	0	1
July,	S.W.	3	28	0	31	0	0	0	0	0	0
Auguft,	W.	5	26	0	31	0	0	0	0	0	1
September,	S.W.	3	24	3	30	2	0	2	0	0	2
October,	N.W.	7	19	5	31	6	2	2	0	0	0
November,	S.E.	9	12	9	31	2	4	7	1	0	0
December,	W.	6	21	4	31	5	2	6	0	1	1
Total.	W.	114	216	35	365	28	13	32*	2	3	5
1796.	W.	148	169	49	366	26	18	38	3	4	7
1795.	N.W.	131	198	36	365	18	33	60	4	3	8
1794.	W.	116	210	39	365	31	18	19	7	3	5
1793.	W.	128	178	59	365	19	12	30	6	3	8

REMARKS.

The temperature of January was in general moderate, and the weather fair; but a few freth breezes came from the weft and fouth: and there was fome fmart froft.—February was a remarkably fine, dry, warm month, as the froft, fnow and winds, were neither fevere nor frequent; the firft being chiefly

* Of the thirty-two frofty days eleven were hoar or white froft.

of the hoar kind, the fecond flight, and the third feldom high. The barometer was unufually high the whole month, conſidering the feaſon (winter), and the prevalent direction of the wind (ſouth). Though the atmoſphere was often hazy, and ſometimes foggy in March, yet there was a good deal of fair, bright, but cold weather; and the freſh gales that happened were in the beginning of the month.—April, as well as the preceding months, was dry, and, generally, bright and temperate.—The beginning of May was cold, with ſeveral hail ſhowers; and, in general, there was a good deal of rain, together with ſome freſh breezes; but the greater part of the month was warm, and the winds ſoft and moderate.—Some mornings of hoar froſt occurred in June; and it was rather a cold month, with frequent ſhowers; yet the quantity of rain was not much; and the greater part of the winds were moderate.—Though there were few days entirely fair in July, yet there were not any entirely wet; the rain having fallen in ſhowers, generally heavy, ſometimes mizzling, but often with conſiderably fair intervals. The temperature of the air was ſoft and warm; and the winds were principally gentle.—The character of Auguſt, in reſpect to fair and rainy days, as well as to the winds, was nearly the ſame as the preceding month; but the ſhowers were in general heavier, whilſt the heat was not ſo great. In this month the electricity of the atmoſphere was ſometimes largely collected, and powerfully active. The 11th, about 12 o'clock at night, a body of atmoſpherical fire, which appeared to have a globular form, paſſed over this city with a loud, awful, rumbling noiſe, and, as it rolled, it diffuſed an extraordinary and extenſive illumination in the air. Its direction was from weſt to eaſt; and it is ſuppoſed to have dropped into the Iriſh Channel, as a meteor of this deſcription was ſeen falling there, by a gentleman croſſing to this country, and who arrived here two days afterwards. On the 29th of this month alſo we had a violent thunder ſtorm, remarkable for the extenſion and denſity of the lightning, and the loud pealing of the thunder.—September was a wet, unpleaſant, blowing month, with ſome loud thunder, and very heavy hail, ſo heavy that ſeveral panes of glaſs were broken in the windows of a houſe a few miles to the N. W. of this city.—October was a rigorous month, having much cold, bluſtry, wet weather, and ſnow from two to four inches deep ſo early in the year as the 19th, which is unuſual in this country.—In November ſome ſtrong gales of wind occurred at night, with a good deal of ſnow, and at

times heavy rain; the freezing was ſevere, but not long, and it was generally attended with fogs; yet once or twice the fog was accompanied with a ſenſible warmth.—There were ſeveral freſh breezes in December, and a ſevere gale from the ſouth-eaſt the night of the 11th, attended with thunder, rain, ſnow and hail; ſome miſts and fogs occurred; and it rained ſeveral times, though the Barometer ſtood high.

Although this year appeared wet, yet a leſs quantity (not thirty-one cubic inches) of rain fell than in ſome preceding years that were thought drier; which is explained by obſerving, that five months in the firſt half year, were particularly fair, and the moſt rain fell in the hay and harveſt months, when the public mind is naturally intereſted in the event, and conſequently would characterize the year according to the nature of the weather at thoſe times.

Obſervations on Meteorological Inſtruments, and on the Weather at Londonderry the three firſt Months of the Year 1798.

Months.	Prevailing winds.	Fair.	Showery.	Wet.	Hail.	Snow.	Froſt.	Lunar Halo.	Aur. Boreal.	Thunder and Lightning
January,	W.	7	20	4	5	2	5	0	0	0
February,	W.	12	12	4	3	5	7	0	1	0
March,	N W.	12	19	0	7	2	2	1	0	0
Total,	W.	31	51	8	15	9	14	1	1	0

GENERAL REMARKS.

January was a wet month; the rain fell chiefly in heavy ſhowers, frequently at night, accompanied with ſeveral freſh gales of wind, which blew principally from the S. W. February was, in general, a fine winter month; the firſt fortnight was remarkably mild, but ſome heavy fogs occurred, and the ſky was frequently covered. After the middle of the month the froſt and ſnow came on, but were not to be reckoned ſevere, and the rain that fell was moſtly in ſlight ſhowers: the winds were for the moſt part moderate; the freſh breezes that happened were neither frequent nor harſh.—The weather in March was in general cold, but not rigorouſly ſo; the winds were principally moderate; and the rain fell chiefly in rather ſmall ſhowers.

Obſervations on Meteorological Inſtruments.

JANUARY.

Barometer	higheſt	30.40	25th. wind E. moderate, fair.
	loweſt	28.84	31ſt. wind W. moderate, rain, ſnow, froſt, and hail.
Thermometer	higheſt	44½	22d. wind W. by N. freſh breeze, ſhowers.
	loweſt	33	31ſt.
Hygrometer	higheſt	43½	28th. wind S. W. freſh breeze, ſhowers.
	loweſt	40¾	2d. wind W. moderate, rain.

Rain 4 inches .532,120 parts.

FEBRUARY.

Barometer	higheſt	30.68	8th. wind W. eaſy breeze, fair, but foggy.
	loweſt	29.17	22d. wind N. W. moderate ſome rain and ſnow.
Thermometer	higheſt	49½	14th. wind W. moderate, ſhowery.
	loweſt	35½	20th. wind N. W. moderate, rain, hail, ſnow and froſt.
Hygrometer	higheſt	44⅘	14th.
	loweſt	42.	17th. wind N.W. freſh breeze, fair, ſnow, hail and froſt.

Rain 1 inch .852,257 parts.

MARCH.

Barometer	higheſt	30.33	23d. wind N. E. moderate, a little rain.
	loweſt	29.64	16th. wind N.W. ſqually breeze, rain and hail.
Thermometer	higheſt	53.	2d. wind S. W. moderate, ſome rain.
	loweſt	37½	10th. wind N. E. moderate, fair, and hail.
Hygrometer	higheſt	44.	2d.
	loweſt	37.	22d. wind N. E. moderate, fair, hail and froſt.

Rain 1 inch .8,911,668 parts.

The city of Derry, where theſe obſervations were made, is ſituated in latitude 55° N. and longitude 7° 40′ W. and ſtands on a promontorial tongue of land, elevated about one hundred feet above the level of the ſea, ſtretching obliquely from weſt to north-eaſt, and terminated with a moderate declination in

a ſhore waſhed by a conſiderable river, called the Foyle. This river, about three miles below the city, dilates into an extenſive eſtuary, which communicates with the northern ſea, from whence the town is diſtant about twenty miles. The depth of the river, oppoſite the town, at low water, is thirty-one feet, and the riſe of the tide is from eight to ten feet, flowing ſeveral miles farther into the country.

From weſt to north-weſt, the town is overtopped by a range of high lands, which are, in a great meaſure, clothed with heath and turf-bog. To the ſouth and eaſt, it is alſo covered by riſing grounds, that are for the moſt part tilled, or fit for tillage. The neareſt mountain is three or four miles to the north-weſt; and many conſiderable ones, at different diſtances, appear from ſouth to north. A hill of ſome note, but comparatively inconſiderable, is ſituated about two miles weſt of the town, ſhowing its ſummit a little above the altitude of the adjacent riſing grounds.

Few trees, or plantations of trees, are in the city, or its vicinage; at leaſt they are not ſo numerous as to be ſuppoſed capable of materially affecting the ſtate of the ſurrounding atmoſphere; nor are there any moraſſes, or ſtagnant pools of water, which can be charged with having any particular influence in this reſpect.

The ground on which the city is built, conſiſts of a maſs of common quarry ſtones, in many ſpots partaking of a ſlaty texture, covered by a ſtratum of clay from three to ten feet in thickneſs. The mean yearly temperature of the ſoil, as deduced from trials made on the water of deep cloſe wells, when at its maximum and minimum of heat, is found to be from 47 deg. 6 min. to 49 deg. which differs very little, in the average, from the mean annual temperature of the place, viz. about 46 deg. nor from the mean annual temperature of the ſtandard ſituation of the latitude, that is, 48 deg. 4 min.

The form of the town is an oblong quadrilateral figure, extending lengthwiſe S. E. and N.W. or a diagonal, drawn from the Cathedral, through the Exchange, to the Magazine, would be nearly on a N. and S. line. Four gates, viz. Biſhop's Gate, Ship-quay Gate, Ferry-quay Gate; and Butcher's Gate, open into four ſtreets, which are named after their reſpective gates, and terminate in a ſquare, called the Diamond. where the Exchange is placed. The firſt gate faces the S. W. and the ſecond is oppoſite to it; the third looks to the S. E. and over againſt it is the fourth. The length of the town, reckon-

ing from Biſhop's Gate to Ship-quay Gate, where it is longeſt, is about 1500 feet; and the breadth, from Ferry-quay Gate to Butcher's Gate, where it is broadeſt, is about 900 feet.

This city is ſurrounded by a wall, which is, in general, above twenty feet broad; but the outſide wall of ſtone, or the battlements, is not more than two feet in thickneſs. The broadneſs of the inſide wall renders it a pleaſant terrace-walk, now carried over the gates by arches, and from which the eye is agreeably intereſted with ſeveral good pictureſque views, although little aided by planting. The views, however, are in general fine; ſo much ſo, that, in the opinion of Mr. Young, the famous Engliſh touriſt, "the ſcene wants nothing but wood to make it a perfect landſcape." This want is daily ſupplying, as ſeveral improvements in building country-ſeats, in improving, dreſſing and planting grounds, have taken place ſince the year 1776, the time in which Mr. Young was in this part of the country. Beſides miniſtering to theſe pleaſing proſpects, this circumjacent platform, which ſerves the inhabitants for air, exerciſe and recreation, conſpires largely with the rectangular poſition and general openneſs of the ſtreets, to maintain a ſalutary ventilation. The number of inhabitants is computed to amount to eleven thouſand nine hundred, reckoning the houſes at ſeventeen hundred, and allowing ſeven perſons to each houſe; which, conſidering the common population of our towns, is rather a moderate rate of calculation.

With reſpect to victuals, and other neceſſaries of life in uſe amongſt the inhabitants, they may be judged of by the following principal circumſtances: the upper claſs lives in that manner, as to meat and drink, which may be termed a generous temperance; they do not, in general, eat animal food more than once a day, for dinner; not commonly, of courſe, for ſupper, and never for breakfaſt. The middle claſs lives proportionably comfortable as the upper, and on nearly ſimilar articles of diet at the ſame meals. The loweſt claſſes ſubſiſt chiefly on vegetable aliment, of which, potatoes here, as well as throughout the kingdom, form the greateſt part. The cloathing of theſe poor people is but bad, many going almoſt conſtantly barefoot; and numbers are but ſcantily ſupplied with firing in winter.

The pump-water within the walls, and that on the outſide near the river, is hard and brackiſh; the former quality, which prevails as the pumps recede from the river, is conſidered to proceed chiefly from the incorporation of ſulphat of lime (ſe-

lenites), and the latter principally from that of muriat of foda (marine falt). But, in fome parts of the fuburbs and their vicinity, there are feveral fprings of pure foft water, which is that ufed for drinking and fimilar dietetic purpofes; the hard water being only employed on the coarfer culinary and domeftic occafions.

[*Dr.* PATTERSON's *account of the difeafes prevalent at Londonderry in the years* 1797 *and* 1798, *fhall appear in our next number.*]

ARTICLE IX.

An Account of the Situation and Difeafes of La Vera Cruz; being an Abftract of two Letters from RICHARD V. W. THORNE, *Surgeon of an American armed Ship, dated refpectively at La Vera Cruz, on the 7th of March and the* 13*th of April,* 1799, *addreffed to Dr.* MITCHILL.

MR. THORNE arrived at La Vera Cruz on the 6th of March, 1799. He defcribes the city as fituated in Mexico, or New Spain, in the province of Tlafcala, on the fide of the Gulf of Mexico, in N. lat. 19, 12, W. long. 97, 30, and about two hundred and fifteen miles S. E. of the city of Mexico. The foil on which Vera Cruz is built, is low, level, fandy, and fo remarkably barren that a green thing is fcarcely to be feen in the neighbourhood of the town. The houfes are built of limeftone, procured from the bay: white-waffhing is ufed inftead of paint; but this has been fo long neglected that the buildings now fhow all the marks of age and decay. The town extends from eaft to weft, is about one mile and three quarters in circumference, and is furrounded by a ftone wall, which, however, in many places, is rendered nearly ufelefs by the accumulation of fand almoft to the top. The houfes are large and airy; but from the low fituation of the place, and the pofition of an adjacent hill of fand ftretching from the N. W. to the S. E. the air is greatly confined, and infide of the wall has little circulation. During the north winds, which often do much damage in this place, by reafon of its expofure on that quarter, the motion of the air, in the central parts of the town, is but little increafed. From this, one may readily judge of the con-

finement of the air, and how liable the town muſt be to the production of infectious exhalations.

Vera Cruz is the grand port of New-Spain; the harbour is excellent, and is naturally defended by rocks. From this port the wealth of Mexico is tranſmitted to Europe, and here the neceſſaries and luxuries of European manufacture are received in return. Its trade may be reputed nearly equal to all the commerce of South-America. Its population is eſtimated at about five thouſand.

Mr. Thorne gives an unfavourable account of the cleanlineſs, as well as of the ventilation of Vera Cruz. In walking through the ſtreets, perſons are often offended by very ill ſmells. Not only excremental matters of the inhabitants are often ſuffered to remain in the ſtreets, but thoſe of numerous domeſtic animals, ſuch as horſes, mules, ſheep, &c. carried by rains, and by the deſcent of the pavements, into the middle of the ſtreets, and there mixed with ſtagnant waters, with the addition of the putrefying carcaſes of horſes, mules, dogs, cats, &c. All theſe things, acted upon by a warm ſun, often emit vapours ſo noiſome as to render the ſtreets ſcarcely paſſable, except by thoſe accuſtomed to them. Many receptacles of filth are allowed to accumulate large quantities of it in and about the houſes, which thus prove an additional ſource of offenſive and unhealthy exhalation.

Mr. Thorne viſited the King's Hoſpital at Vera Cruz. He deſcribes it as a large and lofty building, the wards ſpacious, and capable of accommodating one thouſand perſons. The preſent number of patients is from eight to nine hundred, who are all ſoldiers. From the phyſician of the hoſpital the following account of their common epidemic fever was received:

This diſeaſe moſt commonly attacks foreigners, ſuch as thoſe who come into town from the back parts of the country—the ſoldiers in particular, for they all come from Mexico, which is a fine climate. Theſe men are ſtout, healthy, well looking fellows. As for the natives of the place, who have lived here all their days, it is a very remarkable thing for one of them to be taken ſick with this diſeaſe. The ſoldiers eat great quantities of beef during the time they are allowed it, and are crowded together in great numbers in barracks. Their beef is very lean, and, of courſe, contains ſo much the more ſeptou (azote); and often, at this time of the year (which is not near the warmeſt), it ſmells offenſively when brought from market. As the heat produces this effect now, what muſt it do during

the months of July, Auguſt, and September, in which time of the year there is ſo great havock made among theſe people? They generally are addicted to drinking great quantities of ſpirituous liquor whenever they can get it, and often lie in the open air during the night. This is a common practice with ſome, and ſeems to be a very injurious one, for the air is ſo very moiſt, that fails, during the night, become as wet as if dipped in water. The poorer people live crowded together, and ſleep on damp earthen floors, with merely a mat under them: by theſe means they muſt be expoſed ſtill more to the effects of the principle of infection. The months of July, Auguſt, and September, are very wet; ſo much ſo, that they are called the rainy months, producing all the moiſture as well as heat neceſſary to haſten putrefaction. In ſhort, there is every thing here that is any way conducive to the production of fever.

The ſymptoms that generally attend this diſeaſe are the following, as related by the phyſician of the King's Hoſpital: The perſon is firſt attacked with pain in the head, back, loins, abdomen, and thighs, accompanied with fever, which ſometimes takes place at the firſt, and is very violent. The pain in the abdomen reſembles that of colic. Theſe continue three or four days. If no relief is afforded at the end of this time, vomiting comes on, unleſs a ſort of diarrhœa ſhall have taken place during the firſt two or three days, which being the caſe, the vomiting is prevented. But if a diarrhœa cannot be procured, the vomiting comes on, and is a very unfavourable ſymptom. The matter ejected is of a darkiſh colour, often reſembling coffee grounds, and tinctured with blood, which is a bad ſymptom. If the bowels have been coſtive, they now become looſe, and the excrement that paſſes off by ſtool is very fœtid and bloody. If the patient ſhould ſurvive ſome days, and the vomiting turn to be pure blood, and pure blood be alſo diſcharged by the anus, ears, eyes, any or all of theſe ways, it is a good ſymptom: or if a vomiting of blood takes place in the firſt ſtage, a favourable concluſion of the caſe is to be drawn. The moſt deſperate caſes are thoſe attended with bubos, which are not uncommon. The phyſicians do little in theſe caſes: they truſt principally to nature to ſtop the vomiting, as they know of no medicine that can produce this effect.

Their practice, as far as it extends, is ſimple and good. When thoſe pains take place in the inteſtines, they give gliſ-

ters, every quarter or half an hour, of caſtor oil and water, as is commonly done, and order the patient to drink lemonade freely.

With reſpect to bleeding, this phyſician ſpoke but little in favour of it, and it is very ſeldom reſorted to; "but," ſaid he, "it depends on the habit of body of the patient: if he is of a robuſt conſtitution, bleeding may be uſed with ſervice; but we are afraid of drawing blood, becauſe the part from which it is drawn will have a greater quantity of blood carried to it, and the tendency to putrefaction of that part will be increaſed."

He mentioned ſeveral diſſections, in which the ſtomach and inteſtines were found in a putrid ſtate: the contents of the cranium had undergone no particular change.

After the viſit to the King's Hoſpital, Mr. Thorne made another to the City Hoſpital. The phyſician of this hoſpital was not in attendance at the time; but from what is reported of his practice, he has been very ſucceſsful. His practice (which he has adopted lately) is to bleed; and previous to this, and after it, he gives ice, lemonade, and applies ice externally to the abdomen, and uſes gliſters freely. This practice he has found to be ſucceſsful.

Cold bath and bliſters are aſſerted by this phyſician to be injurious. But if ſo, how (aſks Mr. Thorne) is the ice of ſervice? Reſpecting their opinion of the nature of the cauſe of this diſeaſe, little can be collected; but it is to be concluded they know very little about it. The medical gentlemen here meet, in a little time, to confer on this point.

Of all the Americans who have been here, only three have been attacked with this complaint, and ſome of them have been here four months. Two of them lodged next door to a hoſpital, to which they attributed their diſeaſe: the third was on ſhore during the day, but ſlept on board of his veſſel. They all recovered.

Mr. Thorne ſtates that ſeveral of their men had been attacked with ſomething like this diſeaſe, but had recovered.

LIBRARY OF THE
ESTABLISHED 1813
MUSEUM OF COMPARATIVE

REVIEW.

ART. I. *Rapport fait aux Citoyens* Victor Hugues *et* Lebas, *Agens particuliers du Directoire Executif aux Iſles du Vent, par la Commiſſion etablie en vertu de leur Arrêté du* 12*eme Vendemiaire, l'an* 6*eme de la Republique (Oct.* 3, 1797), *pour examiner la Situation du* VOLCAN DE LA GUADALOUPE, *et les Effets de l'Eruption, qui a eu lieu dans la nuit du* 7 *et* 8 *du meme mois (Sept.* 28 *and* 29). *Port de la Liberté, Guadaloupe. 4to. pp.* 84. 1797.

THE Iſland of Guadaloupe was agitated by numerous ſhocks of earthquakes, and by a voleanie eruption, in the autumn of 1797. The apprehenſion and alarm of the inhabitants were ſo conſiderable, that it was judged proper, by the government, to appoint commiſſioners to inquire into the facts, and report publicly thereon. Accordingly *Victor Hugues* and *Lebas*, the agents of the French Directory for the Windward Iſlands at that time, appointed by their commiſſion, bearing date October 3, 1797, Citizens PEYNE, AMIC, LACHENAIE, FONTELLIAU, and CODE, to viſit the place where theſe ſubterranean commotions had happened, and to report what they ſhould diſcover concerning the qualities of the neighbouring atmoſphere, the productions of the different kingdoms of nature round about, the ſhape and ſtructure of the mountain, its elevation above the level of the ſea, the qualities of the waters guſhing out from its ſides, the ſubſtances diſcharged from its crater, and generally to give their opinion on every thing it exhibited of a nature intereſting to natural hiſtory or phyſical ſcience. The piece before us is the report which the commiſſioners made on that occaſion.

They conclude, from what they obſerved, that the mountain whence the eruption on Guadaloupe proper, or Baſſe-Terre, proceeded, is 4840 feet higher than the level of the ocean, that it has undergone great changes, and will probably undergo more; and that it has a communication or connection with the volcanos in the neighbouring iſlands, and, through them, with the burning mountains of Terra Firma.

They are alſo of opinion, that the change which the atmoſphere underwent from the eruption was chiefly owing to ſulphurated hydrogenous air, and ſulphureous acid gas, let looſe in large quantity (p. 45); that the injury done by them to animal life was more than compenſated, by the diſplacement and renewal of the atmoſpherical fluids in the iſland; that the ſpring waters were nearly the ſame *after* the eruption as *before* it; and that the damage done to plants was owing to the ſulphuric acid which corroded their leaves and ſtalks, and oftentimes killed them.

To give a more full conception of the ability with which this report is drawn up, we inſert the following extract from the deſcription of the Iſland of Guadaloupe (p. 2). "It is ſituated in lat. 16 deg. 4 min. N. and long. 64 deg. 30 min. W. from the meridian of Paris. This iſland, which is reckoned to be about eighty leagues in circumference, is of an irregular form, and ſeparated in two by a canal or creek, called the *Salt-River*. This canal, which is about two leagues long, is from fifteen to ſixteen fathoms wide. Its ſhallowneſs at its extremities or openings, which do not correſpond to the depth of the baſon or interior parts, prevents its being navigable by large veſſels. It is bordered by the *rhizophora* (mangle) of Jacquin, which grows in a drowned and muddy bottom, formed, in a good degree, of decayed parts of that vegetable; and there inceſſantly exhale from the place miaſmata of ſulphurated hydrogenous gas, which render the navigation diſagreeable and unhealthy. On one ſide of this canal is *Grande-Terre*; on the other, the part of the iſland which particularly bears the name of *Guadaloupe*.

"*Grande-Terre* is, in general, a flat country; one, however, finds, in ſome of its departments, hills conſiderably elevated. The ſtones which conſtitute the baſis of its ſoil, as well as the ſhells which compoſe the mountains, prove that it aroſe from the boſom of the ocean. Father *Labat* has ſaid, and the celebrated *Buffon* has repeated after him, in his *Theory of the Earth*—That *Grande-Terre, in ages paſt, was no more than an elevated bottom of calcareous plants (lithophyta), which having acquired conſiderable growth, and filled up the ſpaces between them formerly occupied by the water, have raiſed the ſoil above the level of the ſea, which, on withdrawing, has left the whole of the ſurface dry.* If theſe changes were thus effected, may we not conjecture, in our turn, that nature, in forming *Grande-Terre*, would have

obſerved a kind of ſymmetry, different from that which we actually find in the arrangement of the materials? To be convinced of it, one need but caſt a look at the ſlope of the hill of *La Victoire*, and all thoſe in that part of the iſland. Wherever there are excavations we find them conſtantly calcareous. One may obſerve the diſorder which exiſts in the remains of the ſhells which form their rocks. One may ſee that very heavy maſſes of ſtone lay upon ſtrata of earth conſiderably lighter than themſelves. In ſhort, one may behold that all things there appear to have been mixed, jumbled and huddled together by motions, occaſioned, no doubt, by violent ſhocks of earthquakes. The volcanic ſubſtances, which are every where here to be met with, give an air of probability to this conjecture," &c. "Theſe obſervations have led us to believe, that *Grande-Terre* is an iſland of ſecondary formation, while *Guadaloupe* is of the *primary* kind, and is, perhaps, a portion detached from the continent. In fact, Guadaloupe, ſtrictly ſpeaking, is a pile of high mountains, which ſtretch into a chain from S. S. E. to N. N. W. they ſhelve away toward the ſea, and leave, at their foot, plains as beautiful as productive. The body of theſe mountains, whoſe ſummits are often above the clouds, is formed of *granite*, more or leſs hard, and of a grey or reddiſh colour; of ſand of the ſame nature, and, like the granite, fuſible into a glaſs of a deep green, which ſtrikes fire with ſteel; and, laſtly, of an argillaceous earth, by an alteration in theſe granites and their ſand; an operation which we obſerve, on all ſides, going on under our eyes."

The commiſſioners deſcribe the proſpect from the peak of the mountain thus (p. 10): "From the extreme elevation of this rock there is a moſt aſtoniſhing proſpect. The obſerver has, at the ſame time, under his eyes, the ragged ſummit of the mountain, the cruſt, perpetually ſmoking, under which the furnace exiſts, which has ſeveral times burſt through it, and the rich country beneath, that has been ſeveral times buried under their ruins. And while thus we were taking a near ſurvey of nature in deſolation and decay, we beheld, at a diſtance, the moſt brilliant and animated face of a country, arrayed in the livelieſt colours. From this ſpot the hills below loſt their height; they ſunk, as it were, to enlarge the plain, and ſuffer *Les Saintes* to be ſeen, which did not appear larger than rocks on the ſides of *Trois Rivieres*. On the left we had *Deſcada*, *Marie-Galante*, and *Dominica*;

as well as *Montſerrat*, *Antigua*, *Nevis*, and *St. Kitts*. On the ſouth, *Martinique*, diſtinguiſhable, from a diſtance, like a cloud, terminated the view, low in the horizon."

This volcano was obſerved in 1493 by Columbus. There is no notice of it on record for 152 years afterwards, when, in 1645, it was ſeen and mentioned by Father DU TERTRE. In 1696 it was deſcribed by LABAT, and, ſince that time, viſited by PEYSONNEL. For about ſixty-two years prior to the eruption in 1797, it has, except once, given very little trouble or alarm.

One of the moſt remarkable circumſtances in the report is, that the earthquakes in Guadaloupe, and the other iſlands in the ſame chain and connection, have a correſpondence, both in time, duration and violence, with the volcanic eruptions and agitations of the continent of South-America; and that the ſubterranean diſturbances of the Antilles ariſe from the general cauſe which rocks Peru and Quito, and ſhakes the foundations of the Andes.

We cannot diſmiſs from conſideration this inſtructive report, without expreſſing our ſatisfaction at the promotion of ſcientific inveſtigations during the prevalence of war. Too commonly has it happened, that reſearches of a philoſophical kind have been altogether prohibited, or, at leaſt, ſuſpended, during the ſtriſe of arms. It give us, therefore, the greater pleaſure, to ſee Mars lay aſide ſome portion of his ferocity, and learn leſſons of wiſdom from Minerva. The performance is very honourable both to thoſe who authorized and thoſe who effected it.

ART. II. *Vade-mecum Medicum, in duas Partes diviſum, quarum prior, Noſologiam Cullinæam, poſterior compendium Materiæ Medicæ et Pharmacopœiæ, exhibet, &c. &c. Auctore* Gulielmo Tazewell, *M D. Virginienſe. Lutet. Paris.* A. J. Dugour *et* Durand. *Philadelphia.* Dobſon. 1798. *ſmall 8vo. pp.* 210.

THE book to which this title-page is prefixed is written in modern medical Latin, and contains the arrangement and definitions of diſeaſes, taken, word for word, from Cullen's Noſology. One third of the book is occupied by this.

It contains likewiſe a pharmacopœia, divided into two parts; the former of which is a liſt of ſimples belonging to the Materia Medica, and the latter, of compounds and preparations to be kept in the ſhops, with directions for making ſome of them. Between the two is a catalogue of ſome of the more ſimple chemical preparations, with their French and Engliſh ſynonyma, according to the old phraſeology and to the new nomenclature. For theſe, and the receipts which are contained in the latter part of this collection, the compiler is indebted to the notes he took while attending the claſſes in Edinburgh, to the London Pharmacopœia, and to a work of Mr. Townſend's, which we ſuppoſe to be his "Guide to Health." Theſe occupy a little more than another third of the volume.

Dr. Tazewell next gives what is termed a *poſological table*, or an account of the quantities and doſes of remedies, not unlike that of Sir JOHN ELLIOT'S *Medical Pocket-Book*; and afterwards arranges medicines into nineteen claſſes of ſialagogues, attenuants, demulcents, &c. according to the effects they are ſuppoſed to produce upon the human conſtitution; which we will not ſay are abridged from the complicated *Methodus Materiæ Medicæ* of Profeſſor HOME. At the end of the volume is an etymological index, ſhewing the derivations of ſome of the terms employed in medicine.

To give a regular review of this publication would be no leſs an undertaking than reviewing Cullen's Noſology, the London Pharmacopœia, and a Collection of Practical Formulæ; a taſk we decline to enter upon at large for the preſent. We may, however, make an obſervation or two upon Noſology in general. All of the attempts to arrange morbid affections have been exceedingly imperfect; and it is likely they will always remain ſo. Syſtematic modes of arranging *minerals*, *plants* and *animals*, have been adopted very advantageouſly; and natural hiſtory has been much benefited by them, becauſe each of theſe beings is ſuſceptible of a preciſe and appropriate deſcription. In theſe departments of knowledge, the *claſſes*, *orders*, and *genera*, are the *creatures of art*, but the *ſpecies* and *varieties* are the *productions of nature*. Mineralogy, botany, and zoology, in as much as they are collections of individual exiſtences in nature, are capable of being methodized and diſtributed into an orderly form. We very much doubt, however, whether *diſeaſes* have that appropriate and definite form which enables them to be claſſified like the foſſil, vegetable, and animal ſpecies. Morbid pheno-

mena are not exiſtences *per ſe*, but only accidents, ſymptoms or modifications of ſuch exiſtences as have life: and an arrangement of the diſeaſed appearances of the human body conſtitutes the *noſology of man*. Upon the ſame plan of proceeding there might be made out a noſology of every vegetable and every inſect, of every thing, in ſhort, which is animated, from the lord of the creation down to the moſs which he treads upon. The world would thus be filled with noſologies.

We ſuſpect there is a radical difficulty in all theſe noſological attempts, which it is impoſſible to remedy; and this is, that nature has not diſtinguiſhed ſymptom from ſymptom, in diſeaſes, with the ſame exactneſs by which plant differs from plant, or one animal or mineral varies from another; but, on the contrary, has interwoven the tiſſue of diſeaſes by threads which are inextricable, but by a more correct and ſcientific acquaintance *with their cauſes*. At preſent, not only the *claſſes*, *orders*, and *genera* in noſology, are, as in other caſes of ſyſtematizing, *contrivances of the human head*; but, in moſt of the examples they afford, the *ſpecies* and *varieties* are alſo: ſo that, really, noſology is little elſe than an arrangement of *words* and not of *things*. Perhaps, in the whole circle of human exertion there has not often been an expenditure of ſo much labour and talent to ſo little purpoſe. If there is any branch of knowledge to which *noſology* bears a near reſemblance, it is *heraldry*, where verbiage and nonſenſe have taken almoſt entire poſſeſſion of the field.

If any thing could reſcue noſology from the charge of frivoloufneſs, it is the ſpecimen lately exhibited by Dr. Darwin in Zoonomia. Relinquiſhing the viſionary and ſuperficial arrangements of his predeceſſors, this phyſician adopts four natural claſſes of diſeaſes, founded upon their proximate cauſes, and conſiſting of the different modes of morbid action of the four faculties of the ſenſorium, denominated thoſe of irritation, ſenſation, volition, and aſſociation. As the eſſential characteriſtic of a diſeaſe conſiſts in its proximate cauſe, the noſologiſt can find no other ground upon which he may ſo firmly reſt his claſſic character. Dr. Cullen ſeems to have been ſenſible of the importance of the proximate cauſe in the claſſification of diſeaſes, when he obſerves (Noſologia Methodica, tom. ii. Prolegom. p. 29), "*Similitudo quidem morborum in ſimilitudine cauſæ eorùm proximæ, qualiſcunque ſit, reverâ conſiſtit.*"—Dr. Darwin takes the characters of the

orders from the excefs, deficiency, retrograde action, or other properties of the proximate cauſe. The genus is generally derived from the proximate effect; and the ſpecies generally from the locality of the diſeaſe in the ſyſtem. The advantages of this method of claſſing diſeaſes, according to their proximate cauſes, over all preceding ſyſtems of noſology, ſeem to conſiſt in leading to a more diſtinct and thorough knowledge of the nature of diſeaſes, by a compariſon of their eſſential properties—in facilitating the knowledge of the methods of cure, by bringing together thoſe diſeaſes in a natural method of claſſification, which require ſimilar treatment—and in unfolding to phyſicians the nature and treatment of diſeaſes previouſly unknown, which will always be more readily effected by a natural than an artificial ſyſtem of claſſification.

The formulæ in this collection are various and numerous; and we cannot but remark on the prevailing neatneſs and elegance of preſcriptions among modern phyſicians. We hope ſimplicity will prevail much more in their *recipes*. The compound powder of ipecacuanha, commonly called *Dovar*'s powder, is an inſtance of this. Dr. T. directs it to be made thus: "Take of powdered ipecacuanha, and of purified opium, each one dram, of the ſulphate of potaſh one ounce, mix and rub them well together, until they ſhall have acquired the appearance of a homogeneous powder."—Dr. THOMAS DOVAR, who has left a little practical book, called "*The Ancient Phyſician's Legacy to his Country*," gave the receipt for this ſudorific "preſcription to eaſe the gout" thus: "Take opium one ounce, ſalt-petre and tartar vitriolated each four ounces, ipecacuanha one ounce, liquoriſh one ounce: put the ſalt-petre and tartar into a red-hot mortar, ſtirring them with a ſpoon until they have done flaming: then powder them very fine; after that ſlice in your opium; grind theſe to powder, and then mix the other powders with theſe. Doſe from forty to ſixty or ſeventy grains, in a glaſs of white-wine-poſſet, going to bed: covering up warm, and drinking a quart or three pints of the poſſet drink while ſweating."

A compariſon of the *new* with the *old* mode of preparing this excellent remedy will illuſtrate the greater exactneſs, neatneſs, and eaſe, of making the preſcription now in uſe.

This manual, which Dr. T. has offered to the public, may, we think, be of advantage to ſuch perſons as are not poſſeſſed of the originals: and we hope there will ariſe no objection to the performance becauſe it is written in Latin; for we

cannot but recommend the ſtudy of this learned language, not only as ornamental, but as highly uſeful and neceſſary to conſtitute a great and accompliſhed phyſician. O

ART. III. *A Semi-annual Oration, on the Origin of Peſtilential Diſeaſes, delivered before the Academy of Medicine of Philadelphia, on the 17th Day of December, 1798. By* Charles Caldwell, *A. M. M. D. Senior Vice-Preſident of the Academy. Philadelphia.* Bradfords. 1799. *pp.* 59.

IT is one of the laudable rules of the Academy of Medicine, enjoined by their conſtitution, that an oration be ſemi-annually pronounced by one of their members. The advantages of this rule, in recalling the minds of the academicians to the principles on which the aſſociation was inſtituted, in exciting each other from the languors into which incorporated bodies are too apt to ſink, and in impelling each member in rotation to ſhare the duties and aſſiſt the progreſs of the inſtitution, muſt be extremely obvious.

After ſome prefatory obſervations, containing apologies for the imperfections of the performance, and deprecations of the rigour of criticiſm, which we conceive to be unneceſſarily protracted, Dr. Caldwell proceeds to expoſe the blindneſs and folly which ſo generally lead mankind to imagine peſtilential diſeaſes imported from abroad. Theſe diſeaſes have been chaſed through every quarter of the globe with an ardour which nothing could eſcape; but the hiding-place from which they originally ſprang has never yet been found; and they often dart upon their purſuers with a ſuddenneſs and fatality which beſpeak them to be occaſionally the natives of every climate. In this, as in many other inſtances, ſelf-love, carried to exceſs, acts an irrational part. When peſtilential diſeaſes appear, it is ſurely more eligible, if equally ſupported by truth, to conſider them as originating from cauſes near at hand, and, conſequently, ſubject to controul and removal, than as imported from abroad, and liable to be introduced by a thouſand accidents, independent of ourſelves.

Among the arguments which induce Dr. C. to conſider the peſtilential diſeaſes of the United States as the offſpring of our

own country, is the coincidence of a peculiar conſtitution of atmoſphere. The experience of ages, he contends, will prove that peſtilence can never become epidemic without the concurrence of ſuch a conſtitution. Without deciding whether theſe inſalutary conſtitutions depend upon noxious matter exhaled from the bowels of the earth by earthquakes or volcanos, or any other operation of ſubterraneous fires, he contents himſelf with aſſerting the cotemporary relation of theſe occurrences. And he ſuppoſes the doctrine of morbid conſtitutions of atmoſphere to be eſtabliſhed beyond diſpute, by the prevalence of peſtilential diſeaſes in different and diſtant parts of the globe at the ſame time.

That ſuch a general conſtitution has prevailed in the United States, our author ſuppoſes to be rendered probable by the great number of inſects which have appeared for ſome years paſt. He mentions particularly the Heſſian fly, graſs-hoppers, and muſketoes. The firſt, however, it muſt be remarked, appeared, and committed great ravages, for many years before the occurrence of our late peſtilential epidemics. The fact of the aſtoniſhing number of locuſts which appeared during the memorable plague of Juſtinian, is adduced by way of corroboration of this opinion. Dr. C. alſo infers ſomething uncommon in the ſtate of the air in the late unhealthy ſeaſons—from the frequency of luminous meteors—from the rapid maturity and decay of the fruits of thoſe ſeaſons, as well as from the appearance of ſecond crops of bloſſoms; and, in ſome inſtances, even of ſecond crops of fruit. To theſe proofs of the occaſional exiſtence of ſuch a morbid conſtitution is added the wide-ſpreading prevalence of that ſort of catarrh commonly called influenza.

After theſe obſervations upon general conſtitutions of the air, Dr. C. goes on to treat of ſuch as are local and particular. The moſt frequent ſource of theſe local infections he ſuppoſes to be the putrefaction of organized bodies. In conſidering putrefaction as a generic term, embracing ſeveral ſpecies, and in making ſmall-pox, meaſles, and ſyphilis, the reſults of peculiar modifications of putrefaction, we are apprehenſive that Dr. C. violates probability. We are more inclined to the opinion, that thoſe diſeaſes, poſſeſſing a ſpecific contagion, and a character permanently fixed, are the reſults of a vitiated animal ſecretion, and depend, for their propagation, upon the exiſting ſtock of virus diſſeminated over the globe, or upon a recurrence to the ſource, whatever that may

have been, from which they were originally derived. The phenomena of cow-pox, as lately laid before the public, ſeem to go far towards the illuſtration of this ſubject.

In the next place Dr. C. applies his general doctrine to the particular ſituation and circumſtances of the city in which he reſides. He thinks Philadelphia unfortunately ſituated for ventilation, on account of its diſtance from the ocean, and the want of elevation. The exceſſive heat of the ſummer, increaſed by various circumſtances conſiderably beyond that of the adjacent country, holds a large ſhare in producing the miſchief. But he dwells with more force upon an evil which admits of a remedy, viz. the immenſe collections of filth in and about that city—an evil continually increaſing with the progreſſive enlargement of the city, and threatening conſequences ſtill more dreadful than ſuch as have been already ſuffered. He enforces the neceſſity of reform in the conſtruction of docks and wharves—in the cleanſing of the commons lying in a ſouth-weſtern direction from the town—and in the removal of burying-grounds to a diſtance from the city.

In an introduction prefixed to this oration, Dr. C. more explicitly undertakes to declare his opinions concerning the ſhare which commerce holds among the cauſes of our peſtilential epidemics. He does not believe that, in the years 1793, 1797, or 1798, the American peſtilence was excluſively of domeſtic origin; but proteſting againſt the opinion of its origin from human contagion, he aſcribes much miſchief to the foul air emitted from the putrid ballaſt and damaged cargoes of veſſels. We are not diſpoſed to controvert; on the contrary, we admit the frequent production of caſes of peſtilence from this ſource. That ſuch a cauſe, however, can produce an epidemic prevalence of the diſeaſe, we ſcarcely can believe.—This ſubject has been involved in much intricacy, both in popular and medical diſcuſſion, by an improper confounding of facts as well as of terms. It were to be wiſhed, that the advocates of the importation of peſtilence would always explicitly ſay whether they derive the diſeaſe in queſtion from human contagion, propagated from one perſon to another, or from ſubſtances imbued with ſuch contagion, by contact or a certain nearneſs of approach, like the ſmall-pox and the meazles; or whether they only derive it from the miaſmata of putrefaction, accumulated and pent up in the holds of veſſels or other cloſe places. If they mean the former, the facts on which they ſubſtantiate the opinion have never yet been laid

before the public; and, if the latter, all controverſy ſhould ceaſe. The noxious air of a ſhip's hold differs not materially from that of a houſe or a ſewer. The clamour of importation becomes abſurd: for we ſurely have all the requiſite materials in as great abundance at home (viz. the heat, the moiſture, and the dead animal and vegetable matter) as they can poſſibly be furniſhed in the Weſt-Indies.

Of the confidence with which the author looks forward to the prevalence of the doctrine of the domeſtic origin of peſtilential diſeaſes, as well as of his ſtyle and manner, we offer the following ſpecimen:

" Before concluding my addreſs, allow me, Gentlemen, to congratulate you on the ſucceſs, I had almoſt ſaid the *triumph*, of the principles which the Academy advocates, reſpecting the origin of the late epidemics of America. To ſay that theſe diſeaſes are of domeſtic growth, is no longer denounced as medical hereſy, nor as a ſpecies of blaſphemy againſt our country. On this ſubject the ſhades of prejudice and error are rapidly retreating before the radiance of liberality and truth. As far as relates to the neceſſary importation of peſtilential diſeaſes from foreign countries, the time-worn fabric of ſuperſtition in medicine has received a revolutionary blow, from which it is tottering to the depth of its foundation! Nor is the time far diſtant, when this humiliating monument of the bigotry of ages ſhall tumble to irreparable ruins, around the hoary heads of its ſupporters."

" Perſevere, then, my fellow members, to the completion of the work you have ſo laudably undertaken. Wage for yourſelves, both jointly and individually, nothing leſs than a war of utter extermination againſt thoſe prejudices and errors which threaten the depopulation of the cities of America. While thus engaged, whatever may be the fate of your reputations, with a few of your narrow minded cotemporaries, be aſſured, that, if you continue firm in the track where *philanthropy* leads, and *ſcience* lights the way, you will not, you cannot, fail to receive the approbation and applauſe of a more enlightened and grateful poſterity!"

Such as look for new facts to eſtabliſh the opinions here undertaken to be maintained, or new reaſonings upon the old ſtock, will be diſappointed in the peruſal of this oration.—Amidſt much circuitous and variegated amplification of the more familiar doctrines, and a remarkable diffuſeneſs of ſtyle, which further experience in writing will doubtleſs correct,

we ſee little that has eſcaped the notice of former writers on this ſubject. But, at the ſame time, we muſt allow, that great good may be done in combating the miſtatements, the prejudices, and narrow views of the importers of peſtilence, by laying before the public, again and again. under every variety of form and manner, that maſs of facts, reaſoning and demonſtration, which cannot ultimately fail of producing conviction in every candid mind.

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

State of the Weather and Diseases.

THE approach of the ſeaſon of epidemic ſickneſs awakens all the apprehenſions in the American cities which were ſo deeply impreſſed by the calamities of laſt year. Many reaſons afford ground to believe, that the inſalutary conſtitution of the atmoſphere, whoſe effects have been often felt in the courſe of ſome years paſt, has not yet expended all its force. In many parts of the country, inflammatory diſeaſes, during the winter and ſpring, were more frequent and obſtinate than uſual. In ſome inſtances they diſplayed a malignancy of character not commonly obſerved. The ſmall-pox was ſpread, in the uſual manner, through this city and Philadelphia, by means of inoculation; and, if we are not greatly miſinformed, ſhewed, in numerous inſtances, more unfavourable appearances than common.

The late winter was very long and ſevere. The coldeſt weather of the ſeaſon was during the firſt week in March. Froſt and ſnow began ſo ſoon in autumn, and continued ſo late in the ſpring, that many cattle ſtarved to death throughout the country for want of provender. The ſcarcity of fodder may be judged of by this circumſtance—that there was no grazing, in this part of the United States, between the end of October and the beginning of May. Yet, notwithſtanding the duration and intenſeneſs of the winter, there were inſtances of diſeaſe now and then to be met in the city of New-York, cauſed by ſeptic effluvia. A number of theſe could be traced directly to the remains of the tainted or ſpoiled beef of the preceding ſeaſon, ſold at auction, during the cold weather, for half a dollar the barrel, or for what it would fetch, and uſed for food, in its ſemi-putrid ſtate, by ſome of the poorer order of houſe-keepers: and thus the poiſon was kept in action, and ſpread about the city, in parts very remote from foreign ports, wharves, ſhips, or their cargoes. In ſome caſes, the febrile ſymptoms ariſing from ſuch diet and exhalations became ſerious and alarming.

Since the beginning of ſummer nothing very remarkable has occurred. The weather, though frequently hot, has not generally exceeded the ordinary temperature of the ſeaſon. Rains have fallen ſo ſeaſonably, both as to time and quantity, as to exempt this part of the country from all the inconveniencies of drought and inundation. Remittent fevers have been obſerved in many inſtances, and occaſionally they have been attended with peſtilential ſymptoms. The number of theſe, however, has been ſmall; they have ſhown no tendency to become epidemic; and are probably to be aſcribed either to extraordinary circumſtances of expoſure to putrid effluvia, or to an unuſual prediſpoſition of ſyſtem. The ſporadic inſtances of peſtilential diſeaſe in this ſeaſon, though ſo few in number, are very inſtructive on the conteſted point of their origin. In this city they are not even pretended to be traced to any foreign contagion; and the ſick, ſurrounded as uſual by attendants, have in no inſtance communicated their diſeaſe. And yet, in the more advanced ſtages of our ſeaſons, when noxious exhalations are wrought up to a higher point of virulence, are more diſperſed, and the diſeaſe, of courſe, becomes epidemic, notwithſtanding its confinement, in reſpect of infection, to the local bounds of filth, putrefaction, and confined air, a ſudden transformation (according to the opinion of ſome perſons) takes place, the diſorder, in a moment, is borne on the wings of contagion, and in this manner alone is enabled to fly through its circumſcribed domain!

Lying-in Hospital.

A ſubſcription having been opened in the city of New-York, for the purpoſe of eſtabliſhing an aſylum for the reception of women in a ſtate of pregnancy, who are unable to procure the neceſſary medical aſſiſtance and nurſing, during the period of their confinement in child-bed; and many perſons, influenced by principles of benevolence and charity towards the above claſs of the unfortunate, having liberally ſubſcribed towards the ſame, a meeting of the ſubſcribers was held at the Tontine Coffee-Houſe, on the 9th day of December, in the year 1798, for the purpoſe of carrying it into effect. To this end, Thomas Pearſall, ſen. Robert Lenox, Dr. T. S. Robertſon, Henry Remſen, and Dr. David Hoſack, were appointed a Committee to draft a Conſtitution for the regulation of the above-mentioned eſtabliſhment.

A Conſtitution having been drawn up by the Committee,

and offered to the conſideration of the ſubſcribers, the ſame was approved, and directed to be executed as ſoon as a ſum of money ſhall be ſubſcribed which the Governors may deem ſufficient to defray the expence of the inſtitution.

At a ſubſequent meeting of the ſubſcribers, the following gentlemen were elected Governors for one year:

Thomas Pearſall,	William Houſton,
Rev. Dr. Kunze,	John Charlton,
Robert Lenox,	Andrew Hamerſley,
Cornelius Ray,	David M. Clarkſon,
Archibald Gracie,	William Jauncey,
J. S. Robertſon,	J. C. Van Den Heuvel.
Henry Remſen,	

The Governors, according to the conſtitution, have elected the following perſons as phyſicians of this charity for one year:

Dr. J. R. B. Rodgers,	Dr. Poſt,
Dr. David Hoſack,	Dr. Moore.

We are informed that this Hoſpital will be ready for the reception of patients on the firſt of Auguſt.

A number of perſons have been incorporated in New-York, under the title of the *Manhattan Company*, with the power to raiſe a large capital, for the purpoſe of ſupplying the city with pure and wholeſome water. For the completion of this they are allowed ten years, with the right to employ their ſurplus capital in any manner not inconſiſtent with the conſtitution and laws of the State and of the nation. The Company have made ſome preparations toward the completion of this great and deſirable object.

It is pleaſing to find the people of Philadelphia engaged with ſo much aſſiduity in the plan of ſupplying their city with water. Meaſures are begun, and already in forwardneſs, by which the waters of Schuylkill, which are found, upon experiment, to be eminently pure and wholeſome, will be conveyed to the town in any deſirable quantity. This water will be raiſed to a conſiderable height by the force of ſteam, and conducted through a ſubterranean channel to a reſervoir, built in the central ſquare of the city. Hence it will be plentifully diſtributed through the ſeveral ſtreets; and, by means of ſecondary and ſmaller pipes, conveyed at pleaſure to every houſe.

At a commencement held on the 6th day of June, 1799, at the Univerſity of Pennſylvania, the degree of Doctor of Medicine was conferred on the following gentlemen, who ſubmitted Inaugural Diſſertations to the examination of the Medical Faculty on the following ſubjects:

Mr. Edward Brailsford, of Charleſton, South-Carolina—An Experimental Diſſertation on the Chemical and Medical Qualities of the Nicotiana Tabacum of Linnæus, commonly known by the Name of Tobacco.

Mr. John H. Fouſhee, of Virginia—An Eſſay on Strictures in the Urethra.

Mr. William G. Chalwill, of Tortola—A Diſſertation on the Source of Malignant Bilious, or Yellow Fever, and the Means of preventing it.

Mr. James Norcom, of North-Carolina—On Jaundice; containing Obſervations on the Liver, and ſome of its Diſeaſes.

Mr. Waſhington Watts, of Virginia—An Inquiry into the Cauſes and Nature of the Yellow Fever.

Mr. Arthur May, of Pennſylvania—A Diſſertation on Sympathy.

Mr. Robert J. King, of Maryland—An Eſſay on Bliſters.

A periodical work, entitled the *Monthly Magazine*, has been lately undertaken in New-York. Three numbers have appeared, and they afford a handſome and inviting proof of the judgment and talents of the editor. Beſides a variety of original matter, both entertaining and inſtructive, the *review of American publications*, which the New-York Monthly Magazine contains, is extenſive, and executed with ability and candour. The view which it affords of American literature is truly intereſting.

History.

We are aſſured that a new publication on the *hiſtory of North-Carolina* is in great forwardneſs, and will be put to preſs in the courſe of the enſuing winter. The author is Hugh Williamſon, M. D. and LL. D. long a reſident of that State, and for many years employed in its public concerns.—We have reaſon to believe this performance will be a valuable addition to the ſtock of American literature.

During the ſeſſion of the Legiſlature of New-York at Al-

bany, in the winter of 1798, an act was paſſed to encourage the writing a hiſtory of that State. This arduous work has been undertaken by the Rev. Samuel Miller, A. M. one of the Miniſters of the Preſbyterian Church in the city of New-York, who has already collected a large amount of materials. The bill, which was brought in by Dr. Mitchill, provides for opening the Secretary's and Clerk's offices, throughout the State, to the hiſtorian, and for enabling him to inſpect and tranſcribe the public papers and records which he may want, without payment of the ordinary fees. In a few years, we feel perſuaded, both the civil and natural hiſtory of New-York, which have hitherto been greatly neglected and confuſed, will be brought up to a modern period, with as much perſpicuity and exactneſs as the nature of the ſubjects will admit.

Zoology.

An animal of the *Bos* family, ſaid to be the Pygarg of Deuteronomy xiv. 5. has been exhibited lately in New-York. The creature is a female, and anſwers very well to the Biſon of 2 Pennant's Arctic Zoology. The proprietor ſaid ſhe was brought from Ruſſia, though we think it more probable ſhe is a native of ſome northern part of the American continent.

For ſome time paſt, that large and ſingular bird the *Caſſowary*, has been ſhewn in this city: it was brought, as they ſay, from Batavia. The common deſcriptions of writers are correct enough, as there is little chance of confounding this remarkable animal with any other of the feathered race.

Medical School of New-York.

The annual Medical Lectures in the College of New-York will commence, as uſual, on the firſt Monday of November next; when the courſe on Chemiſtry will be begun by Profeſſor Mitchill; on Anatomy and Surgery by Profeſſor Poſt; on the Theory and Practice of Phyſic by Profeſſor Hamerſley; on Materia Medica by Profeſſor Hoſack; and on Midwifery and Clinical Medicine, in the New-York Hoſpital, by Profeſſor Rodgers.

The lovers of the fine arts have, at this time, an opportunity of being highly gratified in viewing the collection of portraits belonging to Mr. Sharples, in this city. It conſiſts of ſeveral hundred likeneſſes of diſtinguiſhed characters, moſtly now

alive, done by that ingenious artiſt himſelf, and is rapidly increaſing. The pieces are chiefly executed in the crayon ſtile, in a particular manner, wherein Mr. Sharples is very happy and ſucceſsful.

Botany.

The following living plants have been lately received by Dr. Hoſack, Profeſſor of Botany in Columbia College, from Dr. Anderſon, ſuperintendant of the Botanic Garden at St. Vincents.

1. Bread-fruit (Artocarpus Inciſus).
2. Arrow Root (Maranta Arundinacea).
3. Cinnamon (Laurus Cinnamomum).
4. Mango (Mangifera Indica).
5. Vanilla (Epidendrum Vanilla).
6. Lemon Graſs (Andropogon Schoenanthus).
7. Sago (Cycas Circinalis).
8. Dracæna Ferrea.
9. Turmerick (Curcuma Longa).
10. Galengal (Kæmpferia Galanga).
11. Gum Arabic (Mimoſa Nilotica).
12. Liquorice (Glycyrrhiza Glabra).

This preſent was accompanied with about 300 kinds of ſeed of the moſt valuable plants.

The Profeſſor of Botany has alſo lately received from Dr. Smith, Preſident of the Linnæan Society, a large collection of ſome of the moſt valuable of the recent publications on botany.

It is greatly to be deſired that the Legiſlature of the State of New-York ſhould appropriate a ſum of money to the eſtabliſhment of a Botanic Garden in this city. The advantages of ſuch an eſtabliſhment, in improving the means of medical education in Columbia College, and in promoting the riſing ſcientific taſte of our country, are too obvious to need to be mentioned.

The Chemical Society of Philadelphia, beſides a variety of other minerals, from different parts of the United States, have lately received a ſpecimen of the golden or auriferous pyrites from Virginia, from ten pennyweights of which, three grains of gold, twenty-four carats fine, have been extracted.

A quantity of manganeſe has been ſent to the ſociety, from the county of Albermarle, where it is found in abundance.

This mineral now retails in Philadelphia at the rate of elevenpence per pound. It is conſumed in this country principally by potters. It is uſed in Europe, in bleaching, and in the manufacture of glaſs.

A variety of the ſulphate of barytes, called Lapis Hepaticus, accurately deſcribed by Cronſtedt, as the Lieberſtein, or Liverſtone, of the Germans and Swedes, has alſo been forwarded to the ſociety from the ſame place.

This mineral almoſt always accompanies the beſt metallic ores, and is conſidered by mineralogiſts as a happy preſage of finding them. According to the celebrated Becher, it is a certain indication *aut præſentis aut futuri metalli.*

It is hoped that the importance of mineral ſubſtances in agriculture and manufactures, will induce the farmers, and other gentlemen of the United States, to attend to the mineral products of their fields, and ſend them to the Chemical Society of Philadelphia, where they will be accurately analyzed, free of expence. By this means many valuable diſcoveries may be made, and we may become acquainted with the operations of nature in this part of the globe.

Profeſſor Ruſh has juſt publiſhed " Three Lectures upon Animal Life, delivered in the Univerſity of Pennſylvania."

Profeſſor Barton has alſo lately publiſhed, " Fragments of the Natural Hiſtory of Pennſylvania. Part firſt."

Both theſe important publications will be duly noticed in our next number.

Profeſſor Woodhouſe has returned an experimental anſwer to Dr. Prieſtley's pamphlet on phlogiſton, heretofore mentioned in the Medical Repoſitory. It will be given to the public in the fourth volume of the Tranſactions of the American Philoſophical Society, now in the preſs at Philadelphia.

The Academy of Medicine in the city of Philadelphia, whoſe able reports on matters of health have been frequently publiſhed for general inſtruction, has lately obtained a charter of incorporation. The members are aſſiduouſly purſuing the objects of the inſtitution, which are generally the improvement of knowledge concerning the epidemics of North-America; and much good may be expected from their labours. At a late meeting of this learned body, Profeſſor Mitchill, and Edward Miller, M. D. of the city of New-York, were elected correſponding members.

FOREIGN.

Cow-Pox.

We have already given an account of Drs. Jenner and Pearſon's publications on the cow-pox, which tended to eſtabliſh the important fact, that thoſe who have had that diſeaſe, which never proves fatal, and which may always be ſo managed as never to disfigure the patient, are not capable of afterwards taking the ſmall-pox infection—a fact which, if properly followed up, promiſes fair to extirpate the latter diſeaſe, to which more have fallen victims than to the peſtilence itſelf. Drs. Pearſon, Jenner, and Woodville, with a zeal that does them great honour, have ſince beſtowed much attention and labour in aſcertaining, by proper trials, how far it is prudent to perſevere in ſubſtituting a diſeaſe that has hitherto appeared no way dangerous, for one that ſo often proves mortal; and, we are happy to add, with a ſucceſs equal to the moſt ſanguine expectations that could have been formed: in conſequence of which, the following circular letter has been addreſſed to the gentlemen of the faculty:

Sir, *Leiceſter Square, March* 12, 1799.

I hope you will pardon me for taking the liberty to inform you, by way of additional evidence to the teſtimonies I have publiſhed on the ſubject of the cow-pox, that upwards of one hundred and ſixty patients, from two weeks to forty years of age, principally infants, have been inoculated, ſince the twentieth of January laſt, by Dr. Woodville and myſelf ſeparately. I ſhall, at preſent, only communicate the following obſervations:

1. Not one mortal caſe occurred. 2. Not one of the patients was conſidered to be dangerouſly ill. 3. Although the extreme caſes of the ſevere kind, which ordinarily occur in the ſame number of caſes in the inoculated ſmall-pox, did not occur in the above practice; and although many of the patients were even more ſlightly diſordered conſtitutionally, yet the whole amount of the conſtitutional illneſs ſeemed to be as great as in the ſame number of patients in the inoculated ſmall-pox. 4. None of the patients (namely, above ſixty) hitherto inoculated for the ſmall-pox, ſubſequently to the vaccine diſeaſe, took the infection. 5. One of the moſt important facts is, that the local affection in the inoculated part, on the whole, was leſs conſiderable, and of ſhorter duration

than in the inoculated ſmall-pox. 6. In many of the caſes eruptions on the body appeared, ſome of which could not be diſtinguiſhed from the ſmall-pox.

I have ſent the matter of the cow-pox puſtule on the thread incloſed, in order, if you approve of the inquiry, to inoculate with it; and I intreat you to favour me with the reſult of your trials: but I muſt trouble you to apply the teſt of inoculating with variolous matter ſubſequently to the vaccine diſorder.

I have the honour to be, &c. &c. &c.

G. PEARSON.

P. S. I am happy to be able to ſtate, that at Berkeley Dr. Jenner has continued his trials of inoculation with vaccine matter, ſent from London, with good ſucceſs. I ſhould have given you a more circumſtantial account of the caſes here alluded to, but I think it unneceſſary, as Dr. Woodville has a pamphlet in the preſs on the ſubject. [*Philoſ. Mag.*

Recent and numerous experiments, made by the moſt eminent of the faculty in London, tend to confirm the efficacy of the cow-pox, as a means of extirpating that horrible ſcourge of the human race, the ſmall-pox: Several hundred individuals have recently been inoculated for this new diſeaſe in the metropolis, and they have all taken it, and recovered from it in a few days, without its being attended by any illneſs, other than a few puſtules which have appeared in the arm. Theſe perſons have ſince been repeatedly inoculated with the variolous matter of the ſmall-pox, but without effect. Several of them have even ſlept in the ſame bed with perſons in the moſt infectious ſtate of the latter diſorder, but without being in any degree affected by it. *Monthly Mag.*

A tranſlation is in forwardneſs of the valuable Travels of the *Duke de Rochefoucault Liancourt* in North-America, ſo late as the years 1796, 1797, and 1798. The known talents of the enlightened and noble traveller, and the imperfect knowledge, in Europe, of the preſent condition of the United States and of Canada, will, doubtleſs, occaſion theſe volumes to be an acceptable addition to the exiſting books of travels in the Engliſh language.

AGRICULTURE.

It has been commonly ſuppoſed by farmers, that ſeeds and plants will degenerate, unleſs the ground on which they are

planted be frequently changed. Some obſervations and experiments that have been lately made in this country, as well as in America, ſeem to render the truth of this ſuppoſition doubtful. It has been found here, that even potatoes may be conſtantly grown on the ſame piece of ground without any degeneration, provided the cuttings be always made from the fineſt potatoes, inſtead of the ſmalleſt and worſt, which have actually been employed for this purpoſe: and in America, it has been ſhewn, by the actual experiments of Mr. Cooper, that the ſame thing happens with reſpect to the ſeeds of the long watery ſquaſh, early peas, potatoes, and ſeveral other kinds of vegetables. The ſame principle has, indeed, long ago, been applied in the breeding of animals, by Mr. Bakewell. It is generally known, that he improved his breeds by merely coupling thoſe in which the properties he wiſhed to produce were the moſt evident, not regarding conſanguinity, or any other circumſtance.

This is a matter of ſuch extenſive application and importance, that it ought more particularly to engage the attention and obſervation of the practical farmer as well as the horticulturiſt.

In the application of manures to lands too little regard ſeems to have been paid, both in reſpect to its nature and the time of its being laid on. In regard to the laſt, it has been a common practice for farmers to apply manures to graſs lands during the time of froſt in the winter. This is certainly an improper practice, as during ſuch periods no advantage can be derived to the land from it, and, at the thaw, much of its virtues muſt be waſhed away, and its ſoluble parts be deſtroyed; the ground being, in this ſtate, incapable of abſorbing liquids. Many other reaſons forbid this practice, which may be ſeen in an ingenious paper written by Dr. Fenwick. He conceives, that as the elaſtic fluids are the greateſt ſupports of vegetation, manures ought to be applied under circumſtances that favour their generation. Theſe, he ſays, chiefly occur in ſpring, after the graſs has, in ſome degree, covered the ground, by which the dung is ſhaded from the ſun, or early in the autumn, after the hay-crop is removed. This laſt is unqueſtionably the moſt convenient and leaſt objectionable period for the purpoſe in queſtion.

In a Voyage into the Belgic Countries, publiſhed not long ago by the celebrated Forſter, the author ſpeaks of the ſcar-

city of wood of every kind, and eſpecially of that for fuel, with which Europe is threatened. He imputes the growing evil to the great and almoſt ſudden waſte of this valuble neceſſary of life, and goes ſo far as to ſay, that unleſs immediately and effectually checked, it will ſtop the progreſs of civilization, and fruſtrate the efforts of reaſon and philoſophy, in ameliorating the condition of mankind in Europe. However well or ill founded theſe apprehenſions may be, they appear to have excited the attention of France and the Low Countries to ſo deſerving an object. Complaints have been made of the profuſion of wood conſumed in the public offices of France, for which no better reaſon can be given, than that the aſhes (now rendered doubly valuable on account of the quantity of ſalt-petre manufactured in every part of the republic) are the perquiſites of the office keepers.

The French (as was announced in the laſt Monthly Magazine) have formed a National Inſtitute at Cairo. And we cannot but view with reſpect a ſcientific and literary activity, of which the ardour is not to be repreſſed, even by ſuch hardſhips as thoſe of the Egyptian expedition of the French. The liſt of members of this inſtitute contains, among others, the illuſtrious names of Monge, Beauchamp, Berthollet, Dolomieu and Denon. The following queſtions were propoſed at their firſt meeting: 1. How to improve the ſtructure of ovens for the preparation of bread for the army? 2. To find a ſubſtitute that may be uſed inſtead of barley in making beer. 3. What are the beſt means for clarifying and cooling the waters of the Nile? 4. Are wind or water mills the more ſuitable for uſe in Egypt? 5. What are the fitteſt reſources to ſupply the French army in Egypt with gun-powder? 6. What is the preſent ſtate of legiſlation in Egypt; and how may it be ameliorated? 7. To produce a plan of general regulation.—At the ſecond meeting of this inſtitute, Andreoſſy, one of its members, reported, concerning the article of gun-powder, that Egypt had always received its ſupplies of ſulphur from Venice; that its charcoal was ſupplied from the burning of the ſtalks of the lupine; that, however, ſalt-petre is ſufficiently plentiful in Egypt, where it is found both in native veins and alſo manufactured, as in Europe. The ſalt-petre of Egypt he farther reported to be a nitrate of potaſh, and not like the French ſalt-petre, nitrate of lime: the ſtalks of Turkey corn are uſed in its preparation, and it is purified with white of eggs. The gun-powder is

manufactured by workmen who remain naked while they are at work. It is of an excellent quality, and cheaper than gun-powder is in France. The Egyptian gun-powder was formerly an article of exportation to Leghorn. The Beys poſſeſſed no large magazines of gun-powder.—At the third meeting of the inſtitute of Cairo, Berthollet read a memoir on the formation of *ammoniac*; Sulkowſky read a deſcription of the road from Cairo to Salehieé: ſome converſation took place on the ſubject of mills, in which water-mills were concluded to be the fitteſt for uſe in Egypt. Berthollet read an account of the analyſis of the gun-powder of Cairo, in which he ſhewed it to contain only $\frac{5}{72}$ of ſalt-petre, and to be, as to its other ingredients, a mixture of ſulphur, charcoal, earth, and muriate of ſoda, which requires to be lixiviated anew before it can be fit for uſe. Monge read a memoir on the monuments of antiquity in Cairo, in which he propoſed that a particular vaſe of granite, covered with hieroglyphics, ſhould be ſent to France. [*Monthly Mag.*

General Andreoſſy and Citizen Berthollet (according to a diſpatch from Buonaparte of 22 Pluvioſe, 6th year) were on their return from an excurſion to the Lakes of Natron and the Convents of the Copts. They have made ſeveral extremely intereſting diſcoveries; among others, ſome excellent Natron (native alkali), which the ignorance of the miners prevented them from before obſerving. This branch of the commerce of Egypt will thence become ſtill more important.

The favourite ſeats of German literature are ſtill Leipſig, Gottingen, Jena, Weimar, Hamburgh, Berlin, Vienna, Frankfort. Theſe places, either as eminently commercial, as the ſeats of univerſities, and the reſidences of men of letters, on account of particular eſtabliſhments of printers and booksellers, or for other reaſons, have become to the literature of Germany, what Athens and Elis were to that of ancient Greece. Books are inceſſantly manufactured and ſold in them: and amid much mere *book-making*, there are alſo many labours of genuine erudition, occaſional inventions and diſcoveries evincing true philoſophical penetration, and not a few effuſions of poetical genius of ſuperlative excellence.

Dr. Trotter, of the Britiſh navy, is the author, as our readers recollect, of a volume entitled *Medicina Nautica*,

which was publiſhed ſeveral years ago in London. This book has been tranſlated into German by Werner, of Jena, and furniſhed with a learned preface by Hufeland. The author has lately publiſhed a ſecond volume, in which he has devoted a conſiderable number of pages to the diſplay and diſcuſſion of the *doctrine of ſepton*, as contained in the different eſſays publiſhed in the Medical Repoſitory, and in the pieces on the ſame ſubject, therein, from time to time, mentioned or referred to. This volume, we underſtand, is to undergo a German tranſlation by the ſame hand which made a verſion of the firſt.

Dr. Beddoes announces for publication, in two or three weeks, an eſſay on pulmonary conſumption, for the uſe of families.

Report of the Commiſſioners appointed by the National Inſtitute to repeat the Experiments which have been made on Galvaniſm: read in the Name of the Commiſſion, by Cit. Hale. *From the* Bulletin des Sciences, par la Société Philomathique, Thermidor, An. VI.

The commiſſion was not ſatisfied with repeating a great part of the experiments already made: they claſſed them, and rendered them complete by the addition of others which were wanting.

I. The phenomenon of Galvaniſm, taken in general, is as follows: A communication is eſtabliſhed between two points of a ſeries of nervous or muſcular organs, by means of certain determined ſubſtances. At the moment when this communication is made, there take place, in the ſtate of the organs, changes, the nature of which is ſtill unknown; but which are manifeſted by ſenſations more or leſs lively, or contractions more or leſs violent. Theſe muſcular contractions take place even in ſeparated parts of the body, and with as much force as when produced by the moſt effectual means of irritation. The ſeries of muſcular or nervous organs is called the *animal arc*; the other ſubſtances form the *exciting arc*. The compoſition of both may be varied many different ways.

II. Among the effects reſulting from the different compoſitions of the animal arc, the following are the moſt remarkable: A ligature made on a nerve does not intercept Galvaniſm, unleſs it be made on the part ſurrounded with fleſh. If the nerve be cut, and its two ends be in contact, Galvaniſm takes place; but if they are only brought near to each other, without contact, it is intercepted.

III. Among the effects refulting from the different compoſitions of the exciting arc, we ſhall remark the following: The moſt favourable compoſition is when it conſiſts of three pieces, each of which is a different metal. One muſt touch the nerve, and the other the muſcle: theſe are called the *ſupports* or *armatures*. The third forms the communication: this is called the *communicator*. But one or two of theſe may be omitted. Animal bodies, or water, may be placed between them; or other ſubſtances, either metallic combinations, or all other metals, &c. may be ſubſtituted in their ſtead. It has not yet been poſſible to determine exactly what are the moſt ineffectual combinations; but they have been already claſſed to a certain point, according to the degree of their efficacy. Gold, ſilver, zinc and tin, are the metals moſt favourable to Galvaniſm, when introduced into the exciting arc.

In general a ſingle metal does not act, except when all other circumſtances are favourable; but in that caſe it has been often ſeen to act. Error, however, may readily here ariſe; for, if one of the ends of the arc be alloyed, in a proportion ever ſo little different, the arc acts as if there were two metals. By rubbing one end with a different metal, ſometimes even with the fingers, or by breathing upon it, efficacy may be communicated to it, under circumſtances where it would not otherwiſe have poſſeſſed any.

Oxydes act leſs efficaciouſly, *cæteris paribus*, than their metals. Dry carbon acts as an actual metal. It is not intercepted by water and moiſt ſubſtances, nor by the fingers if wet; but this is not the caſe if the fingers be dry. The energy of Galvaniſm is not intercepted or diminiſhed by pieces of dead fleſh. The effects of it are ſenſibly checked by the epidermis; and they are incomparably greater in flayed animals, or in parts of the human body from which the epidermis has been removed.

It cannot be ſaid that Galvaniſm is intercepted by all idioelectric bodies; but, on the other hand, it is intercepted by all ſubſtances which are ſtrong conductors of electricity. Such are flame, very dry animal bones, the ſteam of water, glaſs brought to a red heat, &c.

IV. Galvaniſm is influenced alſo by ſeveral circumſtances foreign to the compoſition of the two arcs. Such as, 1. The ſtate of the parts which are ſubjected to the operation: the freſher they are, the ſtronger are the effects. 2. The longer or ſhorter exerciſe of Galvaniſm: ſuſceptibility of Galvaniſm

is, in general, excited by exercising it; is exhausted by continuance, and renewed by repose. 3. The succession of various experiments. A disposition of metals which at first had been ineffectual, has become effectual after a different disposition. Two uncertain experiments are hurtful to each other, and become still more so if made in succession. 4. The state of the atmosphere. The atmosphere electric; the animal on which the operation is performed charged and insulated, the effect is the same. The whole apparatus placed under water, the effect remains the same.

V. There are various artificial means to weaken or revive the susceptibility of Galvanism. Thus, a frog exhausted and brought near to a charged electrophorus resumed its susceptibility. Alcohol, on the other hand, weakens, and even extinguishes it, so as never to return. Potash produces the same effect, only slowly. According to M. de Humbolt, this susceptibility is, in many cases, restored by oxygenated muriatic acid gas. The commissioners did not observe this circumstance; but they propose to resume the subject, and to repeat several other experiments of that learned philosopher.

They have already repeated those on the action of Galvanism on the heart, and have observed, as he did, that its action is the same as on the voluntary muscles, and that it accelerates their movement.

A new Process for forming the Unguentum Hydrargyri.

As the process of combining mercury with hog's lard is well known to be tedious, and to require a considerable time, the following method of shortening it has been announced by Göttling, in his "Taschen-Buch für Scheidkunstler," for the year 1798. This process, says he, can be speedily performed by the addition of a very small quantity of the flowers of sulphur. For a mixture of two ounces of hog's lard and six drachms of quick-silver, it will be necessary to employ only six grains of the flowers of sulphur, and the process will be completed in a few minutes. I do not see, adds M. Göttling, that so small a quantity of the flowers of sulphur can hurt the effect of the mixture, and am of opinion that this prescription may be of considerable use in pharmacy. [*Philos. Mag.*

Royal Society of London.

At a meeting of this learned body, on the 28th of February, a meteorological paper by Mr. Hutchinson was read; and a curious paper on the submerged forests on the coast of Lincolnshire, endeavouring to ascertain the epoch of the phenome-

non, and containing geological obſervations on the different ſtates in which trees are found in the earth, by Mr. Joſeph Serra de Correa.

The meetings of March 7th and 14th were occupied in reading a curious paper on hermaphrodites; which contains alſo an account of ſome ſingular experiments on human generation, ſimilar to thoſe made by Spallanzani on the canine ſpecies.

Inſtitution for diffuſing the Knowledge, and facilitating the general Introduction of uſeful Mechanical Inventions and Improvements; and for teaching, by Courſes of Philoſophical Lectures and Experiments, the Application of Science to the common Purpoſes of Life.

Our readers will be happy to learn that a new inſtitution, under the above title, which promiſes to be of great public utility, has been ſet on foot in this capital (London), and is expected ſhortly to be eſtabliſhed by royal charter. The Right Hon. Sir Joſeph Banks, who has ſo long, and with ſo much honour to himſelf, preſided over the Royal Society, and whoſe ardour in purſuing whatever objects may tend to promote the intereſts of ſcience can only be equalled by his liberality, in devoting to their advancement a large portion of a princely income, has given every aid, by his own perſonal exertions and his extenſive influence, to give effect to the plan of this inſtitution, which was projected by Count Rumford, the ſtrenuous advocate for the application of ſcience to the common purpoſes of life.

We ſhall give ſuch a ſketch of the plan as our limits will allow, extracted from Count Rumford's original propoſals for forming the inſtitution.

The two great objects of the inſtitution are, the ſpeedy and general diffuſion of the knowledge of all new and uſeful improvements, in whatever quarter of the world they may originate; and teaching the application of ſcientific diſcoveries to the improvement of arts and manufactures in this country, and to the increaſe of domeſtic comfort and convenience.

Rooms will be prepared for the reception and public exhibition of all new and mechanical inventions and improvements worthy of notice; eſpecially of all ſuch as tend to increaſe the conveniences and comforts of life, to promote domeſtic economy, to improve taſte, or to promote uſeful induſtry.

Perfect models, of the full ſize, will be exhibited in this public repoſitory, of all ſuch new mechanical inventions and improvements as are applicable to the common purpoſes of life. Under this head is included, cottage fire-places, and kitchen utenſils for cottagers; a complete kitchen for a farm-houſe, with all the neceſſary utenſils; a complete kitchen, with kitchen utenſils, for the family of a gentleman of fortune; a complete laundry for a gentleman's family, or for a public hoſpital; ſeveral of the moſt approved ſtoves for heating rooms and paſſages.

The machinery exhibited will, as far as poſſible, be ſhewn in action, or in actual uſe.

Open chimney fire-places, on the moſt approved principles, will be fitted up as models in the different rooms, and fires will be kept conſtantly burning in them during the cold ſeaſon. Ornamental as well as economical grates, for open chimney fire-places, will alſo be exhibited; ornamental ſtoves, in the form of elegant chimney-pieces, for halls, drawing-rooms, eating-rooms, &c.

Working models of the ſteam-engine, of brewers' boilers, of diſtillers' coppers with improved condenſers, of large boilers for the kitchens of hoſpitals, and of ſhips' coppers; all with improved fire-places.

Models of ventilators, of hot-houſes, of lime kilns, of boilers, ſteam-boilers, &c. for preparing food for cattle that are ſtall-fed, of cottages.

Various ſpinning-wheels and looms, with ſuch other machinery as may be uſeful in giving the poor employment at home.

Models of all ſuch new invented machines and implements as bid fair to be of uſe in huſbandry; of bridges on various conſtructions, and of all ſuch other machines and uſeful inſtruments as the managers ſhall deem worthy of the public notice:—each article exhibited to be accompanied with a deſcription of it, properly illuſtrated by correct drawings, the name of the maker, the place of his abode, and the price.

A lecture-room will be fitted up, and a complete laboratory and philoſophical apparatus, with the neceſſary inſtruments, be provided for making chemical and other philoſophical experiments.

Men of the firſt eminence in ſcience will be engaged as lecturers; and no ſubjects be permitted to be diſcuſſed but ſuch as are ſtrictly ſcientifical, and immediately connected with that

particular branch of ſcience publicly announced as the ſubject of the lecture.

Among the branches of ſcience that will occaſionally be made the ſubjects of theſe public lectures, are the following:

Of heat, and its application to the various purpoſes of life; of the combuſtion of inflammable bodies, and the relative quantities of heat producible by the different ſubſtances uſed as fuel; of the management of fire and the economy of fuel; of the principles of the warmth of clothing; of the effects of heat and of cold, and of hot and of cold winds, on the human body, in ſickneſs and in health; of the effects of breathing vitiated and confined air; of means to render dwelling-houſes comfortable and ſalubrious; of the methods of procuring and preſerving ice in ſummer, and of the beſt principles for conſtructing ice-houſes; of the means of preſerving food in different ſeaſons and climates; of the means of cooling liquors without the aſſiſtance of ice; of vegetation, and of the ſpecific nature of thoſe effects that are produced by manures; and of the art of compoſing manures, and adapting them to the different kinds of ſoil; of the nature of thoſe changes that are produced on ſubſtances uſed as food in the various proceſſes of cookery; of the nature of thoſe changes which take place in the digeſtion of food; of the chemical principles of the proceſs of tanning leather, and of the objects that muſt particularly be had in view, in attempts to improve that moſt uſeful art; of the chemical principles of the art of making ſoap; of the art of bleaching; of the art of dyeing; and, in general, of all the mechanical arts, as they apply to the various branches of manufacture.

In order that the proprietors of the inſtitution, and the ſubſcribers, may have the earlieſt notice of all new diſcoveries and uſeful improvements that ſhall be made from time to time, not only in this country, but alſo in all the different parts of the world, the managers will employ the proper means for obtaining, as early as poſſible, from every part of the Britiſh empire, and from all foreign countries, authentic accounts of all ſuch new and intereſting diſcoveries in the various branches of ſcience, and in arts and manufactures, and alſo of all ſuch new and uſeful mechanical improvements as ſhall be made; and a room ſhall be ſet apart in the inſtitution, where all ſuch information will be lodged, and where it ſhall be kept for the ſole and excluſive uſe and inſpection of the proprietors and ſubſcribers, and where no ſtranger will ever be admitted.

APPENDIX.

DOMESTIC.

ARTICLE I.

THEORY OF HAIL.

Induction of Facts from the Phenomena of HAIL *and* HAIL-STORMS, *to eſtabliſh Mr.* Mitchill's *Theory of Peſtilential Fluids. In a Letter to Dr.* L. Valentin, *of Cape François, now of Montpellier, dated Plandome, June* 20, 1796.

FROM your letter, dated Norfolk, June 8, 1796, I am very glad to learn you are of opinion, that "the nature of contagious effluvia, or miaſmata, is ingeniouſly explained by the chemical combination of ſepton, or nitrogene, with the matter of heat and oxygene;" and that the facts occurring in the Eaſt-Indies, in the Weſt-Indies, on the coaſt of Africa, and, in ſhort, every where between the tropics, coincide perfectly in ſupport of the principle; yet I own, when I read that Meſſrs. Retz and Pratalongo pointedly deny the influence of air and marſh effluvia in producing fevers, my ſurprize is much greater than that Mr. Ramel ſhould doubt of the utility of meteorological obſervations in the art of phyſic.

It appears to me they have all taken up their opinions haſtily. There are occurrences enough to evince, that many atmoſpherical changes are brought about by the ſame agents, which work memorable effects upon the human body. And, notwithſtanding all that has been ſaid or done by thoſe gentlemen, I am ſtill firmly convinced, that aëriform vapours or exhalations are of mighty efficacy upon animal bodies, and that meteorological regiſters may be of ſome uſe.

In my anſwer to Chancellor Livingſton's letter of the 20th of February, 1796, I endeavoured to ſhow, that the peſtilential compoſitions of ſepton (azote) with oxygene, were decompounded by plants, and that while the principle of putrefaction remained in the vegetable economy as a nutritive ma-

terial, the principle of acidity was discharged, to renew and restore purity to the atmosphere. In this way, I suppose, the operation of door dirt, street manure, stable dung, &c. may be accounted for, as far as those ingredients were concerned.

But there is another point of view in which this matter has presented itself to me. Septous compounds, formed near the surface of the earth, are not more conducive to the *nourishment and growth of vegetables*, than, in the upper regions of the air, they minister to the *production of hail.*

It has been pretended, that the septous and oxygenous airs which compose the earth's atmosphere, exist perpetually in a state of chemical union, because, as they are of different specific gravities, they would otherwise, it is said, separate from each other, and pure oxygenous gas, whose weight is as 0,50694, remain below, while unmixed septous air, whose gravity is as 0,44444, floated above. But if any person will attend to the experiments made by Priestley (2 Exp. and Obs. p. 441, & seq.), on the mixture of different kinds of air that have no mutual action, he will find, that when two kinds of them have been mixed, it is not possible to separate them again, by any method of *decanting*, or pouring them off, though the greatest possible care be taken in doing it. "They may not *incorporate*" so as to form a "*third species of air*," possessed of new properties; but "they will remain equally *diffused* through the mass of each other;" and whether it be the upper or the lower part of "the air that is taken out of the vessel, without disturbing the rest, it will contain an equal mixture of them both." He found this to be the case with inflammable and nitrous air, nitrous and common air, and nitrous and fixed air; and observes, that the phlogisticated and dephlogisticated airs which compose the atmosphere, are of very different natures, though without any known principle of attraction between them, and also of very different specific gravities; and yet they are never separated but by the chemical attraction of substances, which unite with the one, and leave the other, &c.

Such a mechanical mixture between the component parts of the atmosphere, thus seems to prevail, higher than breathing animals have hitherto ascended into it.

Notwithstanding the mention made of Mr. De Luc's meteorological observations upon the mountains of Switzerland, leading to an entire new theory of rain, and standing in direct opposition to the former theory of *dissolution* (Review of ori-

ginal German books, No. I. p. 73.), I feel myſelf ſatisfied in thinking, with Hamilton (Eſſays on the Aſcent of Vapours, &c.), Hutton (Theory of Rain), and Prieſtley (2 Exp. and Obſ. p. 34, & paſſim), that, in the ordinary condition of things, the gaſeous fluids of the atmoſphere all do contain water, or that water enters into their conſtitution. By means of this connection, water, though 800 times heavier than air, may be elevated conſiderably higher than the higheſt land of the globe. If the air loſes its attractive power for the water, the latter is precipitated in the form of rain, cloud or miſt; and if the region where this decompoſition happens, be cold enough, the water will be converted to ſleet, ſnow, or hail.

Beſides this depoſition of water from its chemical union with the atmoſpherical gaſes, nature has provided another proceſs, by which water may be produced. This is by the operation of electricity upon hydrogenous and oxygenous airs.

It has been found by Lavoiſier, Seguin, Jacquin, and their aſſociates, that ſparks ſent through inflammable and dephlogiſticated airs, in proper proportions, convert the whole of them into pure water. And it has been aſcertained by Cavendiſh and others, that if a quantity of ſeptous (azotic) gas is preſent with the other two, there is frequently generated a quantity of nitrous acid. The production of this acid, from the commixture of the three airs in the apparatus, has, indeed, been objected to by ſome perſons as inconcluſive or faliacious; but, I think, without reaſon. That this nitrous acid ſprung from the ſeptous (azotic) air preſent in this experiment, I hold for certain. And thus, in the pneumatic machine, mere water was yielded when the two airs were exploded together, and ſeptous (nitrous) acid when the third was added.

Bergman has confirmed (analyſis aquar. § 4.) the experiments of Margraaf, that rain-water is generally contaminated with ſeptous (nitrous) acid, and that even ſnow-water contains ſome ſlight veſtiges of it.

From the violence, copiouſneſs, and *rapidity* of electrical flaſhes in the clouds, during the prevalence of thunder-ſtorms, there, doubtleſs, is generated a quantity of water from the exploſion of oxygenous and hydrogenous airs in the higher parts of the atmoſphere, quite ſimilar to what happens artificially in the chemical reſervoirs. And as ſeptous air is there abundantly preſent, the formation of the ſeptous acid is, in like manner, very readily accounted for. And thus, if combinations between ſepton and oxygene are good manure, as I have

endeavoured to ſhow, then may a probable conjecture be formed of the final cauſe of lightning happening frequently as it does, in that ſeaſon of the year when plants are growing moſt luxuriantly; to wit, to prepare a manure or fertilizing ſubſtance, which ſhall gently deſcend with the rain, and be diſtributed to the whole vegetable creation, in ſtrength and quantity proportioned to their wants. Thus, though the old idea of *nitre*, formed and floating in the air, is not well founded, yet there are facts enough to evince the preſence of its *acid*.

Strong ſeptous (nitrous) acid, though, when mixed with common water, it produces a great degree of heat, yet, when mixed with ice or ſnow, produces a vaſt degree of cold, inſomuch as to have given riſe to the converſion of that tickliſh fluid quickſilver, into a malleable metal. Such immenſe congelation which was known to Fahrenheit, as long ago as the year 1729, was carried ſo far by Braun, in 1759, by mixing nitrous acid with pounded ice, and with ſnow, as to render mercury ſolid.

The moſt violent and deſtructive hail-ſtorms we feel in New-York are in the ſummer time, generally in June, July, and Auguſt, when the heat is greateſt. They are generally accompanied with black clouds, lightning, and ſtrong guſts of wind, which paſs, in narrow ſtreaks, over a conſiderable length of country. Their duration is very ſhort; but the number and weight of the icy maſſes which fall, are ſufficient, ſometimes, in three minutes, to do exceſſive damage.

From obſervations made on the Cordellieras of Peru, it appears (2 St. Pierre, *Etudes de la Nature*, p. 252.) that the height of 2500 French toiſes above the level of the Pacific Ocean, is the region of perpetual froſt, even under the rays of an equatorial ſun. In the latitude of 41 or 42 degrees north, the altitude of continual ice and froſt, on the Continent, is probably not ſo great by ſeveral hundred fathoms. I ſuppoſe the region of permanent congelation begins in theſe parallels, at ſomewhat more than 10,000 feet over our heads; and this opinion is countenanced by accounts given of the bald-topped white mountains of New-Hampſhire. (3 Belknap's Hiſtory, &c.)

To whatever cauſe the coldneſs of theſe upper tracts of atmoſpheric ſpace is owing, whether to remoteneſs from the earth's ſurface, or to tenuity through want of compreſſion, or to any other thing; this we know indubitably, that the moſt

elevated peaks of the loftieſt mountains of the globe are covered by ſnow and ice. The water from which theſe froſty collections were formed had been elevated to a height conſiderably above their ſummits, in combination with air, and by mixture of various atmoſpherical ſtrata or columns with each other, had been diſcharged in a fluid form, and afterwards hardened to cryſtals in its deſcent. And thus it is evident, while the connection between air as a menſtruum, and water as a ſolvent, laſts, the latter may be raiſed above the region of inceſſant freezing, and there be diſengaged in liquid drops, whenever the concurring circumſtances favour its precipitation.

"How immenſely cold," ſays Franklin (Meteorological Conjectures, &c.), "muſt be the original particle of hail which forms the centre of the future hail-ſtone; ſince it is capable of communicating ſufficient cold, if I may ſo ſpeak, to freeze all the maſs of vapour condenſed around it, and form a lump of perhaps ſix or eight ounces in weight!"

If water is precipitated in ſmall drops, from its ſolution in air, at any height above the region of ſettled congelation perpendicular over us, it will, in the firſt moments of its fall, be probably changed to ſnow; and the flakes of this, as they arrive at lower and warmer ſtrata of air, will be thawed to water again. This is, perhaps, a common occurrence during the warmeſt days of ſummer.

But during the prevalence of our hotteſt weather, pieces of ice, too large and too cold to be melted by paſſing through the heated inferior ſpaces of the atmoſphere, do now and then reach the earth, and remain thereon a conſiderable time before they undergo liquefaction. The queſtion is, What is the immediate cauſe of this phenomenon?

I am prone to believe, that if the flakes of ſnow, before melting, meet with ſeptous acid in the elevated tracts of atmoſphere, the two ſubſtances will act upon each other, as in Fahrenheit's and Braun's experiments, and liquefy; but, during this liquefaction, they will abſorb, in proportion to the quantities of the two materials melting in a given ſpace, an extraordinary quantity of ſenſible heat from the neighbouring objects, and convert it into a latent ſtate; or, in other words, while the ſnow is paſſing to a liquid form, a prodigious degree of cold will be generated.

The experiments already referred to, give us ſufficient proof of the intenſeneſs of the cold produced by mixing ſnow and ni-

trous acid together. Shall ſuch a mixture, which, under favourable circumſtances and artificial management, can congeal quick-ſilver, not be capable, in a natural proceſs, of conſolidating even water into bits of ice, at the height of ten or twelve thouſand feet in the air?

A bare inſpection of a hail-ſtone is ſufficient to ſatisfy the examiner, that the original ſnow-flake, which may be imagined to have conſtituted its nucleus, had been partly, if not wholly, melted before it aſſumed the form of hail. This is alſo apparent from the conſideration, that ſnow-flakes are naturally formed in beautiful and regular cryſtals; and when they deſcend to earth, through an atmoſphere cold enough to prevent their melting, as happens in the winter time, the figured and elegant ſtructure they firſt aſſumed in freezing continues unaltered in ſtill weather, until they alight upon the ground. And further, as there is no inſtance, at leaſt that I know, of water being precipitated from its ſolution in air, in diſtinct drops of ſeveral ounces; but, on the contrary, as it is always ſeparated into ſmall globules, a requiſite to the aggregation and conſolidation of theſe into a large bit of ice is, that between the formation of the original ſnow-flakes and the ſubſequent hail-ſtones, there ſhould have been an intermediate ſtate of liquidity.

Experiments, already made, have evinced (78 Philoſophical Tranſactions, &c.), that when air is mechanically compreſſed, heat is extricated from it; and when the ſame fluid is mechanically dilated or rarefied, heat is abſorbed, or, in other words, cold is produced. The fountain of Hiero, conſtructed on a large ſcale at the Chemnicenſian mines in Hungary, proves the power of air, thus expanded or rarefied, to generate cold. In this machine, wherein the air of a large veſſel is compreſſed by a column of water 260 feet high, a cock may be ſuddenly opened, and as the condenſed air ruſhes out with great violence, and becomes inſtantly very much expanded or dilated, ſo much cold is produced, that the moiſture iſſuing forth with it is frozen, and falls down in the form of ſnow; and, at the ſame time, the nozzle of the cock becomes incruſted with ice. Thus, if mechanical dilation or expanſion ſhould exiſt in the atmoſphere during a guſt of hail, and conſpire with the chemical action of ſeptous acid upon ſnow, the frigorific effect, in ſuch caſes, will be proportionably greater. And this I take to be the fact.

If it is now underſtood how intenſe cold is produced dur-

ing the melting of ſnow, on its mixture with ſeptous acid, and that too during a ſparſe or attenuated ſtate of the atmoſphere, there muſt neceſſarily be a converſion to ice, of a correſponding quantity of water in the vicinity of thoſe operations; and, according to the quantity of ſnow liquefied, the elevation above the earth, the frequency and rapidity of the lightning, &c. will be the amount of hail, the ſize of the lumps, the proportion of rain falling with it, &c. &c. I ſhall juſt add, it is a remark of ſome ancient weather-wiſe people, that a certain *greeniſh* look of the clouds ſometimes forebodes or accompanies hail.

To recapitulate: 1. Water may be precipitated from the air, and fall to the earth through ſpaces warmer than 32 of Fahrenheit's ſcale, as in the rain-drops of common low ſhowers: or, 2. It may be diſengaged, and, in ſome part of its deſcent, paſs through a region colder than 32 deg. whereby the ſeparate globules will be frozen to flakes in mid-air, as in ordinary cryſtals of gently-failing ſnow: or, again, 3. It may, after being ſevered from its connection with air, be converted to ſnow-flakes, which, meeting with ſeptous acid, may be melted thereby, and, eſpecially if a ſudden rarefaction ſhould happen at the ſame time, may produce a degree of cold extreme enough to freeze all the water in the neighbourhood, and form hail-ſtones of the greateſt magnitude.

Before I conclude I ſhall mention a few other particulars which have occurred to me ſince the preceding part of this letter was written. Muſſchenbroeck (Philoſoph. Natural. § 12 49.) has the notion of *ſpirit of nitre* augmenting the cold, by acting upon the conglaciating particles in the air, during the hail-ſtorms of Europe; the worſt of which, wherein maſſes, weighing from eight ounces to a pound weight, have fallen to the ground, have happened in ſummer, and have been attended with a dark and raging tempeſt, and terrible thunder and lightning. De Sauſſure (Eſſais ſur l'Hygrometrie, p. 389.) affirms, that hail is always accompanied by electricity in the atmoſphere, and that he never knew the former to happen, without his electric conductor giving decided tokens of the preſence of the latter, in a form either poſitive or negative. And Bomare remarks (Dictionare d'Hiſt. Nat. art. Salt-petre), it is a matter already known, that fogs are very favourable to the formation of nitre.—The quantity of acid produced may ſometimes be too great for the mere nutriment of vegetables. Its action may be violent enough to injure their health, or even to deſtroy their lives.

The *ſharp* and *acrid* rain which, as Mr. Holm relates, fell in Iceland, during a remarkable fiery eruption from the earth in 1783, was of a peſtilential quality, and ſeemed to penetrate the very bodies of the cattle. Their hooſs became white; their hair fell off, and they were covered all over with puſtules and ulcers. And theſe uncommon phenomena were no leſs deſtructive to the human ſpecies. It occaſioned ſevere pain on the hands and feet where it fell. During ſuch extraordinary commotions in the earth and the atmoſphere, *hail of an uncommon ſize*, and ſnow, were ſometimes obſerved to fall, and evident cold was felt where theſe things took place. This caüſtic and penetrating rain extended to Drontheim, and was felt in other parts of Norway: it was experienced too in the Ferro Iſlands, burning, as it were, the leaves of the trees, and reducing the graſs in the fields to a blackiſh or coaly appearance. Feebler effects were felt in Germany, Holland, and other parts of Europe. From this aſſemblage of phenomena in the neighbourhood of the volcanic eruption, there is great reaſon to believe, that a combination of ſepton (azote) with oxygene took place in or about the ſpots where the thunder and flames agitated the atmoſphere moſt violently. It is rather to be regretted, that Mr. Holm had not exactly aſcertained a point ſo eaſily ſuſceptible of experimental proof at that time: but the phenomena are ſo nearly like thoſe which are induced by ſeptic acid in other caſes, that the corroſive quality of the atmoſpheric water, the eroſion of the leaves of trees, the ſickening of men, as well as of birds, dogs, cats, guinea-pigs, &c. which happened in New-York during the prevalence of their peſtilence, induced by ſubſtances putrefying on the ſpot, and evolving the ſame kind of noxious fluid, *all* point to a ſimilar modification of the atmoſphere in both inſtances. The chief difference in the caſes is this: in Iceland the ſepton and oxygene of the atmoſphere were brought into union by electric exploſion; in New-York the two elements formed a connection during the proceſs of *corruption* in the animal and vegetable ſubſtances which contained them: in both modes ſeptic acid was produced. Why then ſhould not the peſtilential condition of the atmoſphere of Iceland be owing to the ſame cauſe as that of the cities of America? This interpretation pleaſes me the more, as it reconciles the leading principle of my inquiry with the learned and ingenious reſearches of N. Webſter, Eſq. in his elaborate work on epidemic and peſtilential diſtempers.

I entertain a hope, that our ſociety at Cape François will one day be re-eſtabliſhed, and that you will be enabled to com-

pare this explanation with the facts occurring in St. Domingo. You will then, if you find it insufficient, lend a helping hand yourself in solving the paradox, wherefore the largest hail falls during the hottest weather.

I am,

Yours with affectionate regard,

SAMUEL L. MITCHILL.

Plandome, June 20, 1796.

Dr. VALENTIN.

ARTICLE II.

NAUTICAL IMPROVEMENT.

THE subscriber, Captain of the brig Schuylkill, of this port, having, in two voyages to the West-Indies, experienced the salutary effects of a patent machine for expelling the foul air from the holds of ships, invented by Benjamin Wynkoop, of Philadelphia, and constructed in said brig, doth certify, that the same machine, worked by the motion of the vessel at sea, forced a constant current of pure air into the hold, from whence the foul air was thereby expelled; that the seamen were remarkably healthy; no disagreeable smell was perceived from the bilge-water or provisions; the vessel's stores, particularly the liquors, were much cooler than common; and the paint in the cabin not discoloured, as usual in West-India voyages.

As a friend to trade and navigation, the subscriber thinks it his duty to recommend the machine to general use; and from the facts, as stated above, he fully believes it may be the means of preserving the timber of ships, and their perishable cargoes, from the destructive effects of foul air confined in the holds of ships, and of contributing to the health and comfort of passengers and seamen on board.

(Copy.) GEORGE IRWIN.

Philadelphia, May 25, 1797.

I HAVE examined the principle of construction, and witnessed the operation, of Mr. Benjamin Wynkoop's ventila-

tors, on board of ſeveral veſſels in which they have been conſtructed, and am of opinion they will be of great advantage in preſerving the health of the people in ſhips, and the timber from rotting, by the expulſion of foul, and the conſtant circulation of freſh air which they produce. Several maſters of veſſels have informed me, that theſe ventilators have alſo prevented the ſtaining of the paint in the cabin, which they frequently obſerved to take place from the exhalations ariſing from bilge-water, ſugar or molaſſes. I, therefore, earneſtly recommend their conſtruction on board of every veſſel, and candidly declare, I do not know any of the late improvements, in the art of preſerving health on board of ſhips, of half the importance, whether they reſpect economy, eaſe in execution (being worked by the motion of the veſſel), or efficacy.

JAMES MEASE,
Reſident Phyſician of the Port.

Health-Office, State-Iſland, May 26, 1797.

THE ſubſcriber, late Captain of the brig Nancy, of this port, having, in a voyage to the Weſt-Indies, experienced the ſalutary effects of a patent machine for ventilating the holds of ſhips at ſea, invented by Mr. Benjamin Wynkoop, and conſtructed in ſaid brig, doth certify, that the ſaid machine, worked by the motion of the veſſel at ſea, forced a conſtant current of pure air into the hold, from whence the foul air was thereby expelled; that the ſeamen were remarkably healthy, when the crews of moſt of the other veſſels, at the port where the ſaid brig diſcharged her cargo, were very ſickly, and many of them died: no diſagreeable ſmell was perceived from the proviſions or bilge-water: the veſſel's ſtores, and particularly the liquors, were better preſerved, and cooler than common; and the paint in the cabin not diſcoloured, as uſual in Weſt-India voyages.

As a friend to trade and navigation, the ſubſcriber thinks it his duty to recommend this machine to general uſe; and from the facts, as ſtated above, he fully believes it may be the means of preſerving the timber of ſhips, and their periſhable cargoes, from the deſtructive effects of foul air confined in the holds of ſhips, and of contributing to the health and comfort of the paſſengers and ſeamen on board.

January 5, 1798. HENRY GEDDES.

THE machines invented by Mr. Benjamin Wynkoop, for ventilating ſhips, may juſtly be numbered with the moſt important nautical improvements.

The ſimplicity, durability, and compact ſtructure of the machines, are peculiarly adapted to the purpoſe for which they were deſigned; and their conſtant vibration, produced by the motion of the ſhip alone, will keep the air in free circulation, throughout the remoteſt parts of the ſhip.

Thoſe who are immediately acquainted with the injurious effects of foul air on the health of the perſons on board ſhips, and on periſhable cargoes, as well as the frames of the ſhips, will juſtly appreciate their worth. It excites aſtoniſhment that a ſubject of ſuch magnitude ſhould have been ſo long neglected, when we take into view the ſtill more important conſideration of the fatal effects produced by the introduction of peſtilential diſeaſes into our ports. Thoſe diſeaſes, in many inſtances, are doubtleſs generated on board of ſhips (not ventilated), by the putrid exhalations from periſhable materials on board, which are ultimately diſcharged on our ſhores, and, like Pandora's box, ſpread diſeaſe and deſolation through our flouriſhing cities.

Theſe remarks are the reſult of the beneficial effects experienced from two ſuch ventilators, on board of the brig Benjamin Franklin, on her late paſſage from Bourdeaux. Her cargo was altogether wines, near 800 hogſheads of which were claret wines: it is ſubject to fermentation, and, conſequently, very conſiderable loſs. The cargo was landed in the moſt perfect order, perhaps, ever witneſſed on a ſimilar cargo —after filling up the caſks the loſs did not exceed one and a half per cent.

By the operation of the ventilators the hold was kept perfectly cool, the bilge-water free from ſmell, and the paint-work not in the leaſt diſcoloured.

On the voyage previous to the conſtruction of the ventilators on board, the reverſe of all this was the caſe, and only 90 hogſheads of wine on board.

Theſe obſervations have been prompted by a deſire to promote the public good and the intereſts of commerce.

April 2, 1798. LLOYD JONES,
Maſter of the brig Benjamin Franklin.

☞ *Two ventilators, which are amply ſufficient for any ſhip, will not occupy the ſpace of four barrels of flour.*

TWO machines for ventilating the holds of ships, invented by Mr. Benjamin Wynkoop, were fixed in the ship India; one of which being in my state-room, was more immediately under my observation, and I found that it was worked by the motion of the ship at sea, at all times, during a voyage from this port to Batavia. It is therefore my opinion, that the general use of this machine would be the great means of preserving the timber of ships, and their perishable cargoes, from decay, and of contributing to the health and comfort of the people on board.

Philadelphia, Feb. 9, 1799. JOHN ASHMEAD.
Captain of the ship India.

Ship Asia, Delaware Bay, April 8, 1799.

Mr. BENJAMIN WYNKOOP.

Sir,

THE hurry of business, and my short stay in Philadelphia, prevented my informing you of the particulars relative to your improved nautical ventilators. While the ship Asia lay in Batavia roads, I kept one of my people working the foremast ventilator, which he did with a cord fastened to the ring in the front of the machine, and set on a chest in the fore-castle, where it was kept working, alternately, every other half hour in the course of the day, while discharging and lading; by means whereof there was a constant current of air interchanging in the ship's hold; and I was astonished at the pressure of air discharged, while working in the manner above related, as I passed and repassed frequently in the wake of the ventilator, and found it perfectly cool and pleasant; and I can vouch for the utility of the same, as I am confident our crew, ship and cargo, have felt the salutary effects of those machines, both at sea and in port, where they were attended to.

I remain, Sir, with respect,
Your obedient servant,
THOMAS MORGAN,
Master of ship Asia.

FOREIGN.

ARTICLE I.

Deſcriptive Account of a new Method of treating old Ulcers of the Legs. *By* Thomas Baynton, *Surgeon of Briſtol.*

[From Duncan's Annals of Medicine for 1798.]

THE common methods of attempting the cure of old ulcers are, as Mr. Baynton juſtly obſerves, tedious, troubleſome, and uncertain: beſides which, they often become dangerous in their conſequences. It muſt, therefore, be admitted, that any attempts, calculated to leſſen the ſufferings of the patient and the trouble of the ſurgeon, are well entitled to attention.

Mr. Baynton aſſerts, that the means which he here propoſes will, in moſt inſtances, be found ſufficient to accompliſh cures in the worſt caſes, without pain or confinement. Thus the poor man may be enabled to procure his family ſuſtenance, while he purſues the means that are calculated to reſtore him to health.

About the commencement of the year 1792, Mr. Baynton, after having experienced repeated diſappointments in the cure of old ulcers, for which he had tried every remedy, both external and internal, recommended by the moſt eminent practitioners, determined on endeavouring to bring the edges of theſe ulcers, that might in future be placed under his care, nearer together, by means of ſlips of adheſive plaſter. To this he was chiefly led from having frequently obſerved, that the probability of an ulcer continuing ſound depended much on the ſize of the cicatrix that remained after the cure appeared to be accompliſhed, and from well knowing that the true ſkin was a much more ſubſtantial ſupport and defence, as well as a better covering, than that frail one which is obtained by the aſſiſtance of art. But when he had recourſe to the adheſive plaſters with the view of leſſening the probability of thoſe ulcers breaking out again, he little expected that an application ſo ſimple would prove the eaſieſt, moſt efficacious, and moſt agreeable means of treating ulcers.

Although the firſt caſes in which Mr. Baynton tried this practice were of an unfavourable nature, yet he had ſoon the

ſatisfaction to perceive, that it occaſioned very little pain, and materially accelerated the cure, while the ſize of the cicatrices were much leſs than they would have been, had the cures been obtained by any of the common methods.

At firſt, however, his ſucceſs was not quite perfect; as, in many inſtances, he was not able to remove the ſlips of plaſter, without removing ſome portion of the adjacent ſkin, which, by occaſioning a new wound, proved a diſagreeable circumſtance, in a part ſo diſpoſed to inflame and ulcerate, as the vicinity of an old ſore. He therefore endeavoured to obviate that inconvenience, by keeping the plaſters and bandage well moiſtened with ſpring-water, for ſome time before they were removed from the limb. He had ſoon the ſatisfaction to obſerve, that the inconvenience was not only prevented, but that every ſucceeding caſe juſtified the confidence he now began to place in the remedy. He alſo diſcovered, that moiſtening the bandages was attended with advantages which he did not expect. While the parts were wet and cool, the patients were much more comfortable in their ſenſations, and the ſurrounding inflammation was ſooner removed than he had before obſerved it to be.

By the mode of treatment here recommended, Mr. Baynton found, that the diſcharge was leſſened, the offenſive ſmell removed, and the pain abated in a very ſhort time. But beſides theſe advantages, he alſo found that the callous edges were, in a few days, levelled with the ſurface of the ſore; that the growth of fungus was prevented, and the neceſſity of applying painful eſcharotics much leſſened, if not entirely done away.

As the ſucceſs of the means here employed very much depends on the mode of their application, he very properly gives a minute deſcription of the method of procedure which he would recommend.

The parts, he tells us, ſhould firſt be cleared of the hair, which is ſometimes found in conſiderable quantities upon the legs, that the dreſſings may be removed with eaſe, at each time of their renewal, which, in ſome caſes, where the diſcharges are very profuſe, and the ulcers very irritable, may, perhaps, be neceſſary twice in twenty-four hours, but which, in almoſt every inſtance, he has been under the neceſſity of performing only once in that ſpace of time.

The plaſter ſhould be prepared for ſpreading, by melting, in an iron ladle, over a ſlow fire, four ounces of common, or

litharge plaſter, with half a drachm of yellow reſin. When melted, it ſhould be ſtirred till it begins to cool, and then ſpread thinly upon ſlips of ſmooth porous calico, of a convenient length and breadth, by ſweeping it quickly from the end that is held by the left hand of the perſon who ſpreads it to the other end, held firmly by another perſon, with the common elaſtic ſpatula that is uſed by apothecaries. The uneven edges muſt then be cut off, and the pieces ſo prepared cut into ſlips of two or three inches in breadth, and of a length that will leave, after being paſſed round the limb, an end of about four inches.

The middle of the piece ſo prepared ſhould then be applied to the ſound part of the limb that is oppoſite to the inferior part of the ulcer, ſo that the lower edge of the ſlip may be placed about an inch below the edge of the ſore; and the ends ſhould then be drawn over the ulcer, with as much gradual extenſion as the patient can well bear. Other ſlips ſhould be ſecured in the ſame way, each above the other, until the whole ſurface of the ſore and limb are completely covered with the adheſive ſtraps, at leaſt an inch above and below the diſeaſed part.

The whole of the affected part ſhould then be defended with pieces of ſoft calico, three or four times doubled, and very evenly applied; and a calico bandage, of about three inches in breadth, and four or five yards in length, or rather as much as will be ſufficient to ſupport the limb, from the foot to the knee, ſhould be applied with as much firmneſs as can be borne by the patient, and as much evenneſs as can be obtained by the attention of the ſurgeon, by paſſing it firſt round the leg at the ancle-joint, then once or twice round the foot, and afterwards up the limb, till it reaches the knee; obſerving that each turn of the bandage ſhould have its lower edge ſo placed as to be about an inch above the lower edge of the fold next below.

The whole of the parts that are at all affected ſhould then be well moiſtened with cold ſpring-water, poured from a large tea-pot; and if the parts be much inflamed, or the diſcharge profuſe, this ſhould be renewed as often as the heat of the parts may indicate, or, perhaps, at leaſt once in every hour.

The patient may then take what exerciſe he pleaſes; as it will generally be found, that they are eaſier when they walk much, and that their cures are not retarded, but, in moſt inſtances, accelerated by their exertion in that way.

Mr. Baynton has chofen to apply the means here recommended at an early hour in the morning, that is, before the œdema has come on, which frequently attends cafes of this kind; firft, with the view of reftoring the tone of the refluent veffels, by fupporting their fides when in a natural ftate; and, fecondly, with the expectation of being able to bring the divided edges nearer together, while the parts are all in that fituation, and the fkin relaxed, than it would be poffible to do when the parts are diftended by tumefaction.

He prefers the ufe of calico to linen, from much experience of its fuperiority in many refpects. It does not, he tells us, fubject the parts to that inconvenient and undue ftricture which is experienced from the ufe of linen. It is more pervious, and, confequently, prevents the formation of finufes, which might be occafioned by a complete retention of the difcharges, if accompanied with the preffure fo much recommended. It appears to poffefs more of the accommodating properties of the true fkin; and, by its elafticity, it is well calculated to yield a little to mufcular action, while it affords fufficient fupport to the parts.

For a bandage, too, as well as for the plafters, Mr. Baynton thinks cotton much preferable either to linen or flannel: it is more elaftic, foft, and yielding, than the former; and, befides being lefs cumbrous and more cleanly than the latter, it poffeffes alfo, he thinks, the additional advantage of being a much better conductor of that morbid heat which fo conftantly affects inflamed parts, and which it is effential to remove.

Mr. Baynton having thus defcribed his mode of practice, and explained the principles by which he was directed, next proceeds to give proofs of its fuccefs, by prefenting us with an account of feveral deplorable cafes, which were cured by this means, after the complete failure of feveral others. Six cafes are here minutely related, in which this practice appears to have been attended with remarkable fuccefs. Without entering into a particular detail of thefe, it will here be fufficient to mention the following conclufions, which Mr. Baynton draws from them. The firft, third, and fourth cafes prove, he thinks, that deep old ulcers, fituated in yielding parts, may, by the means recommended, have their fides brought into contact, and be cured almoft as readily by the fecond intention as recent wounds, with very little remaining fear, and, confequently, with a diminifhed probability of relapfe. But he conliders the fecond, fifth, and fixth cafes, as going much farther,

and as eſtabliſhing the ſuperiority of this method over every other that has yet been known: for they prove that ſpeedy cures may be obtained in the worſt and oldeſt ulcers of the pooreſt people, even while the true ſkin cannot be brought forward, ſo as, in any degree, to cover the denuded parts.

After ſtating theſe concluſions, Mr. Baynton propoſes it as a query, To what circumſtances are we to aſcribe theſe remarkable effects? From much ingenious reaſoning, he clearly ſhows, that they cannot be referred to the ingredients of the adheſive plaſter, to the effects of the bandages, to the exerciſe that was uſed, nor to any conſtitutional interference, as the ſame effects have always followed the application of theſe principles, whether the patients have been young or old, robuſt or emaciated, temperate or diſorderly; while ointments, compoſed of the ſame ingredients as the adheſive plaſter, bandages, exerciſe, and all the means, except the endeavour to bring the divided parts nearer together, had been tried in every different way without any advantage. But from taking a view of the proceſs of nature, in accompliſhing the cure of divided parts, as deſcribed by Mr. John Hunter, and other diſtinguiſhed writers, Mr. Baynton thinks it is rendered highly probable, that a great part of the advantages which have been obtained by this practice depend on aſſiſting and imitating nature, by mechanically contracting the granulations, obliterating the extreme veſſels, and overcoming the reſiſtance oppoſed to the proceſs of ſkinning, which are the natural conſequences of the application of the adheſive plaſter, in the way that he has recommended.

ARTICLE II.

Account of the FRENCH AEROSTATIC INSTITUTE.

THE Aeroſtatic Inſtitute, founded by the Committee of Public Safety, and enveloped in the moſt profound ſecrecy, at Meudon, to which alſo was added a camp for the exerciſe of the artillery, is even yet looked upon as a ſecret arrangement of the Republic, reſpecting which the greateſt precautions are taken; the doors being ſhut againſt the public and all foreigners.

It was impoſſible to have ſelected a more convenient ſpot

for the eſtabliſhment of the Aeroſtatic Inſtitute than the Royal Lodge of Meudon. From its elevated ſite on a mountain, it commands a beautiful and extenſive proſpect over a plain covered with villages and cultivated fields, interſected by the Seine, and terminated by the city of Paris.

The perfection and the rational application of aeronautics are the objects of the labours of this eſtabliſhment, to which the celebrated natural philoſopher, Guyton Morveau, has, in particular, rendered the moſt important ſervices. But the inſtitution ſtood in need of ſuch a director as Conte, for whom Guyton Morveau has procured the appointment. With a love of the ſcience, Conte unites a penetrating genius for reſearch and invention, accompanied by indefatigable aſſiduity.

The corps of aeronauts, intended to ſerve in the armies of the Republic, and conſiſting of fifty courageous youths, is trained at the ſchool of Meudon: it is there the balloons are prepared which are ſent off to the armies; and every day in the ſummer the pupils are employed; at one time in performing their exerciſes, at another in making reſearches in natural philoſophy, with a balloon which is kept conſtantly filled for the purpoſe.

The improvement of the preparation of the balloon, the diſcovery of a new mode of filling it with inflammable air from the ſubſtance of water (hydrogen gas), diſcovered by Lavoiſier, the invention of a new telegraph, connected with the balloon, are the principal advances which have been made in aeroſtatics at Meudon, under the direction of Conte.

The old lodge of Meudon ſerves as a manufactory for the preparation of the balloons, and of all the apparatus neceſſary to accompany them to the armies. The new lodge is appropriated to the inſtitute, and to the accommodation of the pupils, and of the Director and his family. There were prepared the Entreprenant for the army of the north, by means of which the hoſtile army was reconnoitered at the battle of Fleurus; the Celeſte for the army of the Sambre and Meuſe; the Hercule and the Intrepide for the army of the Rhine and Moſelle.

The ſilk for the balloons is manufactured at Lyons, and is very thick and ſtrong; and Conte has rendered them much more durable by the precaution of only varniſhing the outer ſurface. The varniſh is of an excellent quality; it ſufficiently hardens the outſide, and makes the ſilk ſtick together when the balloon is folded. Moreover, experience has proved that

the inner coat of varnish cannot resist the operation of filling the balloon, that it is corroded by the gas, and that this friction renders the silk flabby.

The filling of the balloon with hydrogen gas is the result of the discoveries made by the great Lavoisier, and has for its basis his important experiment of the decomposition of water.

The gas is prepared by the following simple and unexpensive process:

Six or more hollow iron cylinders are set in brick work, beside and over each other in a furnace, which may be constructed in twelve hours; and both ends of each cylinder are made to project from the furnace. The openings of these cylinders are stopped with strong iron covers, through which metal tubes are let in. The tube, at one end, serves for pouring water, previously heated, into the cylinders when red-hot; that on the opposite side is destined to conduct the air which first presents itself through a reservoir filled with a caustic lixivium, and to convey it into the balloon. The cylinders are partly filled with coarse iron-filings, which the excessive heat of the furnace, kept up with pit-coal during the whole time of the operation, reduces to a state of excandescence. At this stage of the process, the valve of one of the tubes of each cylinder is opened, and a small quantity of boiling water is gently poured into the heated cylinder. As soon as the vapour of the water touches the heated iron, the two substances which compose the water are separated: the one (the oxygen) attaches itself to the iron, which it calcines, and which, after the operation, is found partly crystallized, after the manner of volcanic productions: the other of the component substances of the water (the hydrogen) combines with a quantity of the igneous substance termed *calorique*, and becomes inflammable air (hydrogen gas), which continues in a permanent state of elastic fluidity, and weighs seven or eight times less than the atmospheric air.

As the water contains a small portion of the substance of *carbone (carbonique)*, which would render the air in the balloon heavy, the air, as it first rushes out of the cylinders, is made to pass through a reservoir of water, impregnated with a caustic alkali. This fluid attracts to itself all the *carbonique*, and nothing rises into the balloon but very pure inflammable air.

During the operation, it has sometimes happened that the cylinders, heated to excandescence, melted. To guard against

this accident, the projecting end of the cylinder is furniſhed with a pyrometer, and a ſcale which, by means of an iron rod, indicates the degrees of rarefaction of the air. A particular point on the ſcale announces the moment when the cylinders are heated in the degree neareſt to fuſion: when ſuch is the caſe the fire is immediately diminiſhed. The operation of filling a balloon of thirty feet diameter employs one third of a day.

The exerciſing balloon at Meudon is of a ſpherical form, and thirty-two feet in diameter. Its upper half is covered with a linen caſe, to keep off the rain from the balloon and its netting. This netting, woven with ſtrong cords, embraces the upper part of the balloon, and is deſtined to ſupport the car for the reception of the aeronauts. The balloon, kept conſtantly full and ready for aſcent, and expoſed in the open air in all weathers, preſerves its buoyant ſtation in the atmoſphere, being faſtened on the great terrace of the lodge. When the weather is favourable the aeronautic exerciſes are begun. The balloon is ſet free from its faſtenings, and elevated to a certain height; when the car is made faſt to the cords which hang down from the net: the whole of this is done in five minutes. A Colonel then mounts the car with one of the pupils, and the balloon riſes to the height, generally, of from a hundred and ſixty to two hundred and forty yards. The pupils ſeparate into diviſions, for the purpoſe of holding the balloon in the air, ſuffering it to mount, and drawing it down by means of three principal ropes, faſtened to the net, and ramified with ſeveral others: in theſe manœuvres they employ the aid of a capſtern. When the balloon has been newly filled, has yet ſuffered no evaporation, and ſtill retains all its force, it requires the ſtrength of twenty perſons to hold it; and in that ſtate it will bear eight hundred weight. After a ſpace of two months, though much evaporated, it is ſtill capable of bearing two perſons with their inſtruments, and even a conſiderable ballaſt, at the ſame height in the air: but then ten perſons are ſufficient to hold it.

The car is conſtructed of a light lattice work of wood, lined with prepared leather, and hangs about ſixteen feet beneath the balloon: it affords convenient room for two perſons ſeated oppoſite each other, with the neceſſary inſtruments for making obſervations.

The balloon aſcends as often in the day as is requiſite for the ſucceſſion of the obſervations which are to be made; but

theſe aſcents take place only in calm and ſerene weather.—Whenever any unforeſeen accident occurs, the aerial machine is hauled down in five minutes. In ſtrong guſts of wind, which ſuddenly ariſe, the aeronauts are always expoſed to ſome danger: the balloon, held by the ropes, cannot riſe freely; and its vibrations and fluctuation reſemble thoſe of a paper kite, which has not yet reached a certain degree of altitude. This ſpectacle, nevertheleſs, is more terrific to the ſpectator than to the aeronaut, who, ſeated in his car, which its own weight preſerves in a perpendicular poſition under the balloon, is but ſlightly affected by its deſultory motion. No inſtance of any unfortunate accident has yet occurred at Meudon.

All fear, every idea of danger, vaniſhes on examining the ſolidity of the whole apparatus, the precautionary meaſures, adopted with the moſt prudent foreſight, and the utmoſt ſecurity, and eſpecially when we are more particularly acquainted with the cool unaſſuming ſteadineſs of Conte, the director of the whole.

When the return of peace ſhall allow more leiſure, and ſhall favour the employment of this apparatus in other experiments than thoſe immediately connected with the military ſervice, we may expect to derive from it the moſt important and diverſified advantages to natural ſcience. The experiments will then be conducted under the direction of a committee of Naturaliſts, from the National Inſtitute, with a view of making diſcoveries in natural philoſophy, meteorology, and other branches. When the labours of the Aeroſtatic Inſtitute ſhall have accompliſhed ends ſo important to the arts, and of ſo great general utility, there will be printed a particular account of the eſtabliſhment, and of the courſe of experiment purſued: at preſent theſe matters are kept from the knowledge of the public.

The moſt recent invention of Conte, admirable for its ſimplicity and preciſion, is the aeroſtatic telegraph. It conſiſts of eight cylinders of varniſhed black ſilk, ſtretched on hoops, and reſembling thoſe little pocket lanterns of crimped paper, which draw out and fold down again on themſelves. Theſe eight moveable cylinders, each three feet in diameter, and of a proportionate length, are ſuſpended from the bottom of the car, connected together with cords, and hanging one above another, at the diſtance of four feet. By means of cords paſſing through the bottom of the car, the aeronautic obſervers

direct thoſe cylinders, give them different poſitions at will, and thus carry on their telegraphic correſpondence from the regions of the air.

Conte has further applied his thoughts to the invention of a ſimilar aeroſtatic telegraph, which, without the aſſiſtance of a great balloon, or an aerial correſpondent, ſhould be managed by a perſon ſtanding on the ground, by means of cords; the apparatus being ſuſpended to a ſmall balloon, of only twelve feet diameter.

Coutel, captain of the aeronautic corps, was the man who aſcended with the Entreprenant balloon, on the 26th of June, 1794, and who conducted the wonderful and important ſervice of reconnoitering the hoſtile armies at the battle of Fleurus, accompanied by an adjutant and a general. He aſcended twice on that day, to obſerve, from an elevation of four hundred and forty yards, the poſition and manœuvres of the enemy. On each occaſion he remained four hours in the air, and, by means of preconcerted ſignals with flags, carried on a correſpondence with General Jourdon, the commander of the French army.

His intended aſcent had been made known to the enemy, who, at the moment when the balloon began to take its flight, opened the fire of a battery againſt the aeronauts. The firſt volley was directed too low: one ball, nevertheleſs, paſſed between the balloon and the car, and ſo near to the former, that Coutel imagined it had ſtruck it. When the ſubſequent diſcharges were made, the balloon had already reached ſuch a degree of altitude as to be beyond the reach of cannon ſhot, and the aeronauts ſaw the balls flying beneath the car. Arrived at their intended height, the obſervers, remote from danger, and undiſturbed, viewed all the evolutions of the enemies, and, from the peaceful regions of the air, commanded a diſtinct and comprehenſive proſpect of two formidable armies engaged in the work of death.

On the Uſe of the Gaſtric Juice of Graminivorous Animals in the Cure of Ulcers. By Dr. John Harneſs, *Phyſician to his Majeſty's Fleet in the Mediterranean.*

MR. THOMAS CORBEN, boatſwain of his Majeſty's ſhip the Egmont, was, on the 31ſt of July, 1796, received into the Dolphin hoſpital-ſhip, with a ſcorbutic ulcer

on the right leg, the external ſurface of which was ſix inches in length, and four in breadth. The ſurrounding integuments were detached to a conſiderable diſtance, and their margin, with the much greater portion of the ſurface of the ulcer, in a ſphacelous ſtate. The diſcharge was ſo acrid as to deſtroy every part it came in contact with, and it had inſinuated itſelf through the whole length of the gaſtrocnemius and ſoleus muſcles. From between the muſcles which were detached from the bones, nearly the whole length of the ulcer, a very large quantity of moſt offenſive matter was diſcharged; a conſiderable portion of which lodged in a cyſt, formed by the detached integuments, on the exterior and interior part of the leg. There was very great tenſion of the whole length of the extremity, and the patient's general health was much impaired.

From the very unfavourable appearance of this caſe, and from being perſuaded that it would be found impracticable to effect a cure by any of the above-mentioned remedies, in which my own opinion was corroborated by that of Mr. John Gray, a very ingenious practitioner, and ſurgeon of the hoſpital-ſhip, I was induced to have recourſe to the gaſtric fluid of graminivorous animals, which I knew could be eaſily obtained from the bullocks and ſheep daily killed for the uſe of the fleet. A bullock being killed in the evening, near three pints of the fluid were obtained, with part of which the ſurface of the ulcer was waſhed, as were the whole of the ſinuſes, by injecting the fluid with a ſyringe. Superficial dreſſings of lint were then applied, and particular attention was paid to the application of bandages and compreſſes, that they might, as much as poſſible, prevent a further inſinuation of matter, as well as for the purpoſe of bringing and preſerving the parts as much in oppoſition as their diſeaſed ſtate would admit of, that every advantage might be derived from the adheſive inflammation which I expected this application would excite.

The third day after this application was begun, upon removing the dreſſings, the whole of the ſphacelated parts came away, and expoſed a large portion of the tibia, in two different places. To theſe pledgets of lint, dipped in the fluid, were applied, which not only appeared to prevent the injuries uſually attendant on theſe caſes, diſcolouration and exfoliation, but, on the contrary, in the courſe of eight days, the parts thus expoſed were covered with granulations; and at the expiration of fourteen days, the whole of the ſoft parts were perfectly re-united, and the ſurface of the ulcers reduced to a ſore

of about two inches and a half diameter, with granulations, ſmall, compact, and of a beautiful florid colour. It is now, Nov. 10, perfectly healed, and the patient, although a very luſty man, enabled, by the aſſiſtance of an claſtic bandage, to attend the duties of the ſhip.

After the three firſt dreſſings, the gaſtric fluid of the ſheep was uſed; from the ſhip's being at ſea, we were not enabled to obtain any from the bullocks.

To remedy this patient's ill health, an aperient medicine was firſt given; after which he was directed to take half a dram of Peruvian bark, in two ounces of the decoction, every ſix hours. He was, at the ſame time, directed to make uſe of as many lemons and onions in the courſe of the day, as his ſtomach could eaſily bear. It was aſtoniſhing to obſerve with what rapidity he gained ſtrength, after the ſphacelated parts were thrown off.

Since this trial I have had the ſatisfaction of finding the gaſtric fluid ſucceed in more than a hundred inſtances, where ſphacelus had occurred. And the teſtimonies of its peculiar good effects, in ſimilar caſes, by Mr. Jones, ſurgeon to the naval hoſpital at Baſtia, and by Meſſrs. Read and Buck, two of his principal aſſiſtants, convince me of the propriety of making its efficacy generally known.

I have, at preſent, a patient in the Dolphin, a ſeaman belonging to the Barfleur, who, by long confinement in bed, in a typhus fever, became excoriated in three different places, which all terminated in extenſive mortifications. The ſphacelated parts, in this caſe, were entirely removed by the application of the gaſtric fluid; and the patient is now ſufficiently recovered to walk about.

Mediterranean, Nov. 10, 1796.

ERRATUM.

In Dr. WOODHOUSE's anſwer to Dr. MACLEAN, in the ſecond volume of the *Medical Repoſitory*, p. 400, 29th line from the top, the following ſentence ſhould have been inſerted:

"The next thing which engages your attention relates to finery cinder and charcoal. It is aſſerted by Dr. Prieſtley, that great quantities of inflammable air may be procured from theſe ſubſtances, though both may have been previouſly expoſed to ever ſo high a degree of heat."

MEDICAL REPOSITORY.

VOL. III.—No. II.

ARTICLE I.

Two Caſes of the human Conſtitution being affected by the Contagion of Small-pox and Meaſles, at the ſame Time. In a Letter from Dr. PHILEMON TRACY *to Dr.* MITCHILL, *dated Norwich (Connecticut), July* 19, 1799.

IN the ſpring of the year 1797, being then engaged in inoculating for the ſmall-pox, two caſes fell under my care, which exhibited unequivocal evidence of the poſſibility of two diſtinct diſeaſes ariſing at the ſame period in the human frame, and each purſuing its ordinary courſe as when ſeparately exiſting, attended with all their uſual characteriſtic marks; and, though I am ſenſible that the weight of medical opinion may militate againſt my experience on this queſtion, ſtill the concluſive evidence that the facts afford, has removed every doubt that previouſly exiſted in my mind on contemplating the ſubject, and leads me to cheerfully ſubmit the caſes to the candour of the faculty.

Caſe 1. W. T. a young man, applied for admiſſion into my hoſpital for inoculation, and mentioned, at the ſame time, his having been expoſed, a day or two previouſly, to take the meaſles, which excited ſome anxiety in his mind reſpecting the ſafety of receiving the ſmall-pox, under the liability of being affected with the meaſles at the ſame period. Thinking this a good opportuntity to determine, whether two ſpecific contagions could operate at the ſame time on the human frame, and concluding no great danger would attend the experiment, I received him into the hoſpital, and inſerted the variolous matter, from a well ſuppurated puſtule, in the uſual manner. The local inflammation, at the part inoculated, came for-

ward at the common period, with as much activity as occurred on the other patients, at the same time inoculated; which was followed by the precursory eruptive fever, on the eighth day from inoculation. The symptoms were mild, and continued to the tenth day, at which period a number of distinct pustules were visible around the place inoculated, and many were discoverable on the face and neck, just emerging from the skin; the eruptive symptoms continued still in a moderate degree. The mild form which the variolous disease at this time assumed, greatly relieved my patient from his anxiety, arising from the fearful apprehension of being jointly attacked with two so formidable diseases, as the small-pox and measles, at the same period. I left him in this state of tranquillity; but in about four hours after I was called to visit him, and found him labouring under severe pain in the head and loins, attended with rigors, pyrexia, &c. As he had not exposed himself to take cold, or been guilty of any marked imprudence, I immediately suspected him affected with the premonitory symptoms of measles; and, in conformity with this belief, adopted phlebotomy, with the antiphlogistic method generally. On the next day the measley efflorescence made their appearance on the surface, attended with cough, coryza, and all the other usual marks of this disease, which progressed in the common manner to a favourable issue. During this period, from the first accession of the measley symptoms, the local inflammation at the part inoculated continued bright, and the previous pustules not only remained visible, and progressing towards maturation, but a number of additional pustules actually appeared on the lower extremities, easily distinguishable by their hardness and prominency, and which maturated in the usual manner, as when separately existing, except that the suppuratory process seemed less rapid than in many other cases: thus, hand in hand, these two disorders proceeded to a favourable termination, which freed my patient from his great solicitude, and impressed me with the belief, that different sensitive principles of the animal frame may be morbidly excited, from different causes, at the same period, each equally productive of its peculiar form of disease.

Case 2. J. S. after being exposed to the small-pox, in the natural way, was seized, at the usual period, with the symptoms of the disorder, which were followed by a pustular eruption on the surface; and, on the next day from their first appearance, was attacked with symptoms of a similar aspect

to thoſe which ſupervened in the former caſe, though in a more aggravated degree, which I treated as in the former inſtance, and which were followed by a univerſal meaſley eruption on the third day, with the uſual concomitants. During this period, the previous puſtular eruption, which was copious, remained bright and prominent, and new puſtules continued to appear on the lower extremities, all of which proceeded to maturation in the uſual manner; while the meaſles purſued their ordinary courſe, neither diſeaſe ſeeming to retard the other in its progreſs, but, like two friendly ſojourners in ſeparate apartments of one tenement, ſeemed mutually diſpoſed to purſue their different careers, without officious interference or moleſtation to each other. This caſe, like the other, terminated happily. No room was left to doubt the identity of the meaſles in either caſe, as neither of the ſubjects had previouſly been affected with that diſorder: both had been expoſed to take it; and a conſiderable number of my patients at the hoſpital, without having been ſenſibly expoſed to the diſeaſe in any other way but from theſe patients, were affected at the uſual time with this diſorder.

Feeling myſelf greatly incompetent to explain the variant ſenſitive principles in the human machine, which are ſubject to be conjunctly excited from different cauſes, each productive at the ſame time of the phenomena, peculiarly marking diſtinct diſorders, I ſhall avoid the attempt; but this belief is ſtrongly impreſſed on my mind, that two or more ſpecifically different diſorders may ariſe at the ſame time in the human frame, and purſue their natural courſes, notwithſtanding the zeal with which the Brunonian advocates attempt to ſupport the untenable theory of the unity and indiviſibility of their principle of excitability pervading the ſyſtem at large, and being ſuſceptible of only an individual morbid excitement at a time.

ARTICLE I.

An Account of Diſeaſes prevalent at Londonderry in the Years 1797 *and* 1798; *communicated in a Letter from Dr.* WILLIAM PATTERSON *to Dr.* MILLER.

[Continued from p. 46, and concluded.]

INTESTINAL FEVER.

A DISEASE appeared in November, 1797, and diſappeared in February, 1798, which might be called a dyſenteric or inteſtinal fever, as it commenced, and generally proceeded, with ſymptoms of pyrexia, attended, in every caſe, either conſtantly or at intervals, with affections of the bowels, ſuch as pain, diarrhœa, mucous ſtools, and teneſmus, not often with blood. The ſubjects of it, in its ſevereſt degree, were principally children, from two to ten years of age, and thoſe almoſt entirely females, few or no males having been affected with it, at leaſt in any obſervable meaſure.

The manner in which adults were affected was, firſt, by a ſlight feveriſhneſs and ſharp gripings, which, in moſt inſtances, were ſoon followed by a copious diarrhœa, that generally terminated the complaint in three or four days; and the more early and abundant this diſcharge, the more expeditious and perfect was the recovery. Very few adults were long affected; and when they were, it was only in thoſe caſes where the diſtemper partook moſt of the dyſenteric nature: but in the worſt of theſe caſes, though emaciation was conſiderable, the bodily ſtrength was not proportionably reduced.

In the young patients, although the teneſmus was often urgent, yet little blood appeared in the ſtools; but ſometimes two or three table-ſpoonsful of this fluid, pure and unmixed, were evacuated from the anus, and with evident relief of the inteſtinal diſturbances. The pulſe, in theſe patients alſo, was from 90 to 120 in a minute; quickeſt when the febrile ſtate prevailed moſt; but ſeldom was it found to have any ſort of fulneſs. Near the commencement of the diſorder, the thirſt was, in general, greateſt: it often remitted in the courſe of the malady: ſometimes it ceaſed; but it was governed by the temper of the fever. The tongue was uſually mellow, and not more changed than by being ſometimes covered with a thin pellicle of whitiſh fur.

The head ached at times; but in the main it was affected

with wandering pains; and ſimilar complaints were now and then referred to the trunk and extremities, eſpecially towards the departure of the diſeaſe, and when it had manifeſted moſt of the febrile propenſity, without free evacuation from the bowels.

The ſkin was almoſt univerſally dry, ſometimes hot, ſometimes cold, and, at other times, in its natural temperature; the greateſt degree of heat, as might be expected, taking place in the ſevereſt paroxyſms of fever. The appetite was early impaired, and continued very defective throughout the whole of the diſorder, until the dawn of amendment appeared, when the food became more grateful, and afterward the natural deſire for it gradually increaſed; but in the pureſt dyſenteric caſes it returned the moſt ſlowly, and was the moſt inconſtant, keeping pace with other movements towards recovery.

Until the diſeaſe began to diminiſh, and eſpecially in the exacerbations of fever, the ſleep at night was diſturbed and unſatisfactory; during which a good deal of incoherent muttering was expreſſed; but at no time did any permanent delirium, or unconſciouſneſs of mind, ſtupify the patient. In the febrile predominancy, the ſtrength was moſt reduced, but ſooneſt reſtored; in the dyſenteric, it was variable, but ſeldom depreſſed, except at the onſet and recurrence of pyrexia.

In moſt caſes, after a few days in the beginning, there were clear remiſſions; and ſometimes there were evident intermiſſions, for two, three, or more days, promiſing to end ſoon in recovery, but in that reſpect proving deceitful. The duration of the diſeaſe was from two to five or ſix weeks; the moſt purely febrile modification being of the ſhorteſt, and the moſt unmixed dyſenteric form being of the longeſt continuance; whilſt the caſes in which diarrhœa occurred were the moſt abbreviated and eaſy of all.

In one caſe the tongue, membrane of the cheeks, and of the gums, ſwelled, inflamed, and degenerated into ſmall ulcerations, which were ſoon healed by the uſual methods, and which ſeemed to act, in ſome meaſure, as a critical ſolution of the diſeaſe. In no other inſtance did I obſerve any eventful exertion, eſpecially tending to curtail the diſorder, if we except the diſcharge of blood above-mentioned, though this ſeemed rather to lead towards an amendment, than to operate as a tranſlated action, or criſis of the diſtemper.

The moſt ſucceſsful *method of treatment*, in the febrile

preponderancy, was calomel purges, neutral mixtures, cool air, cold drinks, and every branch of what is termed the antiphlogiſtic regimen: in the dyſenteric aſcendancy, caſtor oil (found the moſt ſalutary laxative), enemas, milk, eſpecially butter-milk, ſucculent fruit, vegetable aliment, well-ventilated apartments, and great cleanlineſs in every particular. Antimonial emetics were uſed at different ſtages of both modifications of the malady, but not with any obvious advantage. When the dyſenteric character prevailed, pulv. ipecac. comp. was adminiſtered, yet it was not followed by any viſible good effect. The cinchona, which, at ſundry times, ſeemed to be particularly indicated, inſtead of anſwering the intention, manifeſtly diſagreed with the patient, or appeared to be perfectly neutral: nor had aqueous preparations of colomba and gentian roots more curative operations, but were not as unfavourable, or indifferent medicines, as the cinchona. Where ſtomach debility ſeemed to retard recovery, and where the circulation and the bowels had become placid, the ſulphuric acid was called into aid, but was not found a contributive article. In ſhort, a well-regulated diet, with due attention to the other non-naturals, as they are termed, was the beſt aſſiſtance in the convaleſcent ſtate, and in expediting the return of uſual health.

Under this management, which I ſoon adopted, I did not loſe a patient; nor did I hear of any fatality cauſed by this diſorder in the town. In the country, however, although it was there generally more mild, ſome fatal inſtances occurred; but theſe, I underſtood, were occaſioned by prepoſterous treatment of the feveriſh ſymptoms. On the ingreſs of this epidemic, I was at ſome loſs to decide upon its real nature, as it aſſumed a diverſity of feature and form; but by early and attentive obſervation, I ſoon diſcovered its intrinſic character, and acquired a criterion to judge of the moſt rational way of treating it. This ſort of dilemma, I believe, is the inevitable fortune of a practitioner at the entry of moſt epidemic diſtempers: it was the caſe of the great Sydenham; and ſhall we hope, or preſume, to be more promptly ſagacious and comprehenſive than the Britiſh Hippocrates?

As the febrile caſes, in a few patients, were the moſt urgent and intereſting, I ſhall ſubjoin one of the more important and inſtructive, from its putting on ſome of the appearances of that treacherous diſeaſe, *hydrocephalus internus*, or rather, *febricula hydrocephalica*, in its firſt and moſt wily ſtage.

Case.

On Wednesday evening, the 17th of January, 1798, I first visited Miss ——, aged five years, and found her sitting, with her head leaning on a person's breast. Her pulse was quick, 106 in a minute; skin dry; breathing moderate; countenance heavy, yet flushed. Her eyes were not dull, nor morbidly affected in other respects; but were perfectly obedient to different degrees of candle-light, although she had particularly complained of pain in them. Tongue but little furred. She had not had any material vomiting, but was affected by a degree of retrograde motion about the pharynx, whenever she took any sort of liquid.

The account which I received of the beginning and progress of the ailment was, that the child first complained of pain in her bowels, and, eight days before I saw her, was attacked with diarrhœa, for which she took no medicinal article, except some rhubarb; and that the diarrhœa continued troublesome only four or five days; but when it abated, that she appeared to grow worse instead of better.

The family apothecary had seen her the day before I saw her, and had given her one or two grains of calomel, and some ol. ricini, without any visible effect. I ordered a cantharides plaster to be laid over the scapulæ, and when this was applied, to administer an emolient injection. Whilst the plaster was applying the child grew faintish, which greatly alarmed her parents, but from which she soon recovered.

18th. Morning. Slept uneasily last night, though her rest was better than in several preceding nights. Pulse 120, sharp, with a crepitous feel; skin dry; no evacuation by the enema. In the afternoon the pulse was not altered; nor was it changed at the beginning of the night, except being lessened in number two strokes or beats, and it was not so crepitous; mouth was tinged with a wash of red wine, which I prohibited, and, instead of it, ordered one composed of water, lemon-juice, and sugar. Ordered six grains of calomel, and six of jalap, to be well triturated together; then to be divided into three doses, and one to be given every second hour, till they operated. Soon after the second dose another sick fit came on, but it was of short duration. Two or three loose motions, mixed with frothy mucus, followed the use of the second dose of the laxative powder. The blistering plaster operated thoroughly. —Before I attended, the child drank reluctantly during the

day, but with more freedom at night; and, in general, ſince I ſaw her, ſhe took drink with much leſs repugnance.—Squalls often to-day, yet the ſound is not in a ſhrill ſcreeching tone—toſſes a good deal, but can lie equally eaſy on either back or ſides. Her eyes continue to look healthy—made more water laſt night than before at any period—ſleeps compoſedly and breathes eaſy. She had been much lightened of complaints this morning, but ſhe did not long continue ſo. Complained of pains in different parts; ſometimes in her head, ſometimes even in her feet, but moſtly in the abdomen, which is much contracted.

19th. Morning. Though ſhe reſted but indifferently laſt night, her pulſe does not exceed 104, is ſofter and more equable, and free of the crepitous ſenſations—aſked for a little food—drinks better than yeſterday. Her limbs had been ſeldom cold, nor did ſhe complain of chilline's at any period of the diſeaſe, although ſhe was at firſt obſerved to creep towards the fire. At night her pulſe was nearly the ſame as in the morning—had two eaſy motions, without any material pain, and of a more healthy colour and conſiſtence. When ſhe ſqualls to-day it ſeems to proceed from a petted and peeviſh ſtate of temper, more than from an incitement of bodily pain—ordered to continue the diluting cool drink, viz. butter-milk, thin gruel, and plain water; alſo a doſe of kali citrat. dilutum, every ſecond hour, and to have the enema repeated at night. She ſat out of bed better and longer to-day than yeſterday, being at the ſame time more attentive to things around her—eyes look well.

20th. Morning. Reſted better laſt night—had a moiſture over the ſurface—during the night drank above a quart of butter-milk, which is her favourite drink—appetite for ſolids ſtill bad—has had four motions, charged with frothy ſlime—pulſe 98, and communicates that kind of ſubſiding feel to the finger, ſo ſenſibly to be diſtinguiſhed in the decline of febrile diſeaſes, eſpecially in that of typhus.

21ſt. Morning. Night's reſt ſtill better, though ſhe had twelve ſtools ſince yeſterday morning—pulſe 104—ſome more tokens of returning appetite. Notwithſtanding the pulſe is quicker than yeſterday, yet ſigns of recovery, in other reſpects, are increaſed.

22d. Morning. Reſted very well laſt night—appetite much better—thirſt nearly vaniſhed—pulſe 96, and its *ſubſidence* more ſenſible—little of the citrated kali was taken. All medi-

cines are omitted, and reſtoration left to the cautious management of diet.

25th. Afternoon. Pulſe 106—was more uneaſy, and ſeemed more feveriſh in the opinion of the family the two preceding days than this day—has had ſome ſlimy motions—thirſt little, ſometimes complains of pains in the hypochondriac and hypogaſtric regions—reſts pretty well at night. Ordered a doſe of oleum ricini.

28th. Afternoon. Pulſe 116—tongue clean—appetite tolerable—no thirſt—reſts well—bowels leſs irregular. Ordered a doſe of oleum ricini in caſe it be requiſite. This evening came on a ſevere trembling, likened to a febrile rigor, and ſuppoſed to be due, partly to an increaſe of fever, and partly to ſeeing a favourite parent for the firſt time ſince her illneſs.

31ſt. Afternoon. Pulſe 104—ſleeps remarkably well at night—bowels more natural—has ſtill ſome evening increaſe of fever—complains of tranſient pains in the head and ſide. Oleum ricini, laſt preſcribed, was not given, as the bowels continued in a better ſtate.

Henceforth the child amended progreſſively, but with a degree of evening exacerbation for three or four days; after which, in eight or ten days more, ſhe was perfectly reſtored to the fond wiſhes of her anxious and affectionate parents.

Jaundice.

Upon the retreat of the inteſtinal fever, the jaundice ſucceeded; and, like the former, was chiefly confined to the younger ages; but its ſubjects were not ſo young as thoſe of its predeceſſor, being chiefly patients at the ſtate of adoleſcence, or arrived at puberty; differing likewiſe in another circumſtance, namely, that of not being principally confined to the female ſex. A few perſons farther advanced in life, had a malady, putting on an icterical appearance, whilſt it ſeemed to proceed more from an injury in the parenchymatous ſubſtance of the liver, than from any incidental derangement of the bile or its paſſages.

The prevailing icterical affection commenced with diminution of appetite, ſtomach ſickneſs, and laſſitude; which progreſſively increaſed to a certain degree, and then gradually abated. The pulſe was ſometimes quick, ſometimes ſlow; the ſkin and the tunica conjunctiva of the eyes were tinged

with a yellow hue, but seldom deeply; and a pressing thirst now and then teased the patient. In one of the cases, that of a lady, where the liver seemed to be substantially engaged, the yellowness was generally much increased by exercise; an occurrence that appeared to me remarkable, as I had not before observed it in similar diseases—and this patient, though beset with several unfavourable symptoms, was fortunately cured.

The disease, in its leading shape, was treated with antimonial vomits chiefly; some laxatives were occasionally administered, and afterwards bitter infusions were prescribed, by way of finishing the cure. But I have a strong suspicion, that the greater part of the remedies ordered for these purposes was unnecessary; as I am inclined to believe, that the disease was of the nature mentioned by Darwin, Class 1, 2, 4, 19; and, if so, it would, as he remarks, probably have ceased of itself in about a fortnight, like a common catarrh, without the aid of medicine. This species of jaundice he ascribes to a thickening of the coats of the common bile-duct, by inflammation, or increased action of their vessels, so as to prevent the passage of the bile into the intestines, in the same manner as the membranc which lines the nostrils becomes thickened in catarrh, so as to prevent the passage of air through them; and this he considers a frequent cause of the disorder, especially in children. What more probable time for the occurrence of such a cause than in an epidemic season, wherein the bowels were essentially concerned, accompanied with feverish affections?

Catarrh.

In the spring of 1797, a catarrhal disorder was very prevalent, but disappeared on the approach of warm summer weather. It consisted in a sensitive irritative fever, composed of slight chilliness, head-ache, impaired appetite, some thirst, pain in the eyes, stuffing of the nostrils, heat of the skin, and increased pulse. A cough attended; it was slight in the beginning of the disease; and, what seems worthy of remark, as the cough increased, the other symptoms abated, and recovery soon ensued. Persons liable to complaints of the stomach, or of the head, found those parts, on this occasion, more severely affected than other parts of the frame. A child, about seven years old, subject to irritative fever, accompanied with hot flushings, head-ache, and affections in the eyes, even to strabismus, had a notable degree of these appearances, whilst under the influence of the prevalent disorder.

The treatment was very ſimple; and, in fact, the diſeaſe did not require any other; nothing more being indicated than what is found moſt ſalutary in that ſlight irritative fever, or warm catarrh, called a common cold; namely, diluents, cool apartments, refrigerant remedies, and vegetable aliment. Before concluding, it may be neceſſary to remark, that neither in this diſtemper, nor in the prevalent jaundice, nor in the dyſenteric fever, was the lancet employed: I did not meet a caſe in which its uſe was clearly pointed out: and as the febrile ſymptoms betokened generally more of an inirritative than of an irritative nature, there ſeemed to be good reaſon to prohibit, rather than to command veneſection. Nay, further, as the aſcendant nature of fever, in this country, is typhoid, frequently in its worſt character, that of typhus gravior, or of the ſenſitive inirritative type, we are more ſparing in the employment of general blood-letting than practitioners are in the weſtern world.

Quadruped Distempers.

When the ſubject of epidemics affecting the human ſpecies is under conſideration, it is natural to beſtow ſome thoughts on thoſe maladies which prevail, in the ſame ſeaſon or year, amongſt the inferior ſpecies of animals, inhabitants of the ſame terreſtrial abode; and in this we are ſanctioned by the example of eminent medical obſervers, both ancient and modern, who were led to believe that the cauſes, on theſe occaſions, were, in ſome ſort, congenerous, and that the effects were illuſtrative of one another. In this view, the *cat-diſtemper* of 1797, from its extraordinary expanſion, becomes a ſtriking object of attention. It was univerſal in this kingdom; but I regret that I cannot, from my own obſervation, nor, at preſent, from that of any other perſon, give you aught ſatisfactory concerning it. From what I can learn, it began in the ſouth of Ireland, ſome time in the ſpring of that year, nearly about the time it was obſerved to commence in London; and it gradually extended to other parts of the country, until it traverſed the whole iſland. With us, in the N. W. of Ulſter, its egreſs ſeemed ſynchronous with the ingreſs of our inteſtinal fever, which, conſidering the circumſtances noted in the ſecond number of your Repoſitory, deſerves to be held in recollection. Darwin, Claſs II. Order i. Genus 3. is likewiſe well worthy peruſal, with a view to elucidation of this ſubject.

The ſymptoms of this malady, amongſt thoſe domeſtic quadrupeds, according to what I heard in common converſation, and according to my own ſcanty remarks, did not materially differ from the ſymptoms that appeared both in England and America. As to remedies with us, little or none were employed: the animals were generally left to their fate. In ſome inſtances, I was told, that a countryman in this neighbourhood was ſucceſsful, or ſuppoſed to be inſtrumental in ſaving the creatures' lives by the adminiſtration of emetics. The fatality was extraordinary: in ſome houſes, a number of their cats, kept up by ſucceſſive ſupplies, has been cut off to the amount of ſix or eight in a houſe. What then muſt have been the mortality over the whole kingdom?—It ſeems a fact worth remarking, that of ſix or ſeven cats, great favourites, and highly fed, in a gentleman's houſe in the country, not one was obſerved to be in the leaſt indiſpoſed, whilſt thoſe in the ſurrounding farm-houſes and cottages were ſick or dying.

ARTICLE III.

Dr. Priestley's Reply to his Antiphlogistian Opponents.

No. I.

To the Editors of the Medical Repoſitory.

Gentlemen,

HAVING advanced all that has occurred to me of much moment in defence of the doctrine of *phlogiſton*, I ſhall now, according to my promiſe, diſcuſs the replies of my opponents; and I am happy to find in Dr. Woodhouſe one who is equally ingenious and candid; ſo that I do not think the cauſe he has undertaken will ſoon find a more able champion, and I do not regret the abſence of M. Berthollet in Egypt. Dr. Woodhouſe's objections to what I have publiſhed are contained in the fourth volume of the *Philoſophical Tranſactions of Philadelphia*, p. 452, &c. and your *Repoſitory*, vol. ii. p. 398, &c. Not to tire your readers, I ſhall reply to the ſeparate articles in ſeparate letters, and recite ſeveral new experiments.

The antiphlogiſtians maintaining, as a principal ſupport of their hypotheſis, that the calx of mercury is made by the metal ſimply imbibing pure air, and that it becomes running mercury again by nothing more than the expulſion of that air, I obſerved, that when the calx is revived in inflammable air, a great quantity of that air diſappears, and enters into it. And whereas to this it was replied, that this air does not enter the calx, but, uniting with the pure air expelled from it, forms *water*, I ſhewed that (beſides that no ſufficient quantity of water is produced when it is revived over mercury, like what is found when finery cinder is revived in the ſame circumſtances) in ſeveral of my experiments, in which much inflammable air diſappeared, the pure air expelled from it was found mixed with the remainder, as appeared both by the teſt of nitrous air, and by ſome diſagreeable exploſions which happened in the proceſs.

To this Dr. Woodhouſe replies (Philadelphia Tranſactions, p. 463), that the inflammable air that I made uſe of muſt have been mixed with atmoſpherical air, or an exploſion would not have happened. Now, he ſhould not have charged an old experimenter with ſo very groſs an overſight; and I can aſſure him that all the inflammable air I made uſe of was examined with the greateſt care immediately before the experiments, and was found, by the teſt of nitrous air, to contain no ſenſible proportion of atmoſpherical air. He alſo ſays, page 464, that "when the proportion of the precipitate is large, and the inflammable air ſmall, after the inflammable air diſappears, the precipitate will give out its oxygen, and the air which remains will be diminiſhed by the teſt of nitrous air." In this caſe, however, there could not be any exploſion.

Since I have received his anſwer, I have repeated my experiments with all the attention that I could give to them, and I ſhall ſtate to you what I obſerved. I heated a quantity of red precipitate in $28\frac{1}{2}$ ounce meaſures of pure inflammable air till it was reduced to $24\frac{1}{2}$ ounce meaſures, and found that, whereas before the proceſs it was not in the leaſt affected by nitrous air, the ſtandard afterwards was 1. 8. ſo that it contained a conſiderable mixture of pure air. I repeated the experiment ſeveral times, and always found pure air mixed with the inflammable, when I had revived any part of the mercury.

Continuing one of the proceſſes till, after the diminution, the quantity of air began to increaſe, there was an exploſion;

but it only raiſed the receiver in which the air was confined about an inch, and recovering its poſition, it broke the earthen diſh in which it was placed. After this I made uſe of a tin diſh, and repeating the experiment, there was an exploſion ſo loud, that a perſon at a conſiderable diſtance was alarmed, and came running to ſee what had happened. The receiver, which was a very heavy one, was blown much higher than my head; but, falling on the graſs, was not broken. After this I thought it unneceſſary to make any more experiments of the kind.

But ſince Dr. Woodhouſe ſays, page 462, that when he revived red precipitate in this manner, the remaining air was not diminiſhed by the teſt of nitrous air, I adviſe him to repeat the experiment over mercury, which I have frequently done, and without having any exploſion. Nor has this always happened when I have uſed water. The reſult of many of my experiments over mercury will be found in the ſixth volume of my *Obſervations on Air*, p. 128, which I ſhall take the liberty to recite; and they were made when I was a convert to the doctrine of the compoſition of water.

"The greateſt difficulty that occurred with reſpect to the "preceding theory of the conſtitution of water aroſe from my "never having been able to procure any water, when I re-"vived mercury from red precipitate in inflammable air, or at "leaſt not more than may be ſuppoſed to have been contained "in the inflammable air. In order to make the experiments "with the ſcales of iron, and that with the red precipitate, as "much alike as poſſible, and that I might compare them with "the greateſt advantage, I made them immediately one after "the other, and with every circumſtance, as nearly as I could, "the ſame. The inflammable air was the ſame in both the "experiments, and both the ſcales of iron and the red preci-"pitate were made as dry as poſſible. They were heated in "veſſels of the ſame ſize and form, and equally confined by "dry mercury. And yet, when I heated the former, water "was formed as copiouſly as I have deſcribed it before, viz. "actually running down the inſide of the veſſel in drops, "though only four ounce meaſures of inflammable air were "abſorbed. But though I heated the red precipitate till eight "ounce meaſures of the inflammable air were abſorbed, and "only three-fourths of an ounce meaſure remained, there was "hardly any ſenſible quantity of water produced, certainly "not one-tenth of what appeared in the experiment with the

" ſcales of iron. There was this difference, however, in the " two reſults: In what remained from the experiment with the " red precipitate, I at this time procured a ſlight appearance of " fixed air, whereas there was none in what remained from " the ſcales of iron. The reſiduum alſo from the red preci- " pitate had in it a ſmall portion of dephlogiſticated air: for, " being mixed with an equal meaſure of nitrous air, the ſtand- " ard of it was 1. 8. In this experiment there can be no " doubt but that the dephlogiſticated air diſlodged from the " red precipitate, united with the inflam air in the veſſel; " and, as no water was produced, they have formed ſome " more ſolid ſubſtance, which, in the quantities I was " obliged to uſe, could not be found.'

In making theſe experiments over mercury, we neceſſarily uſe but ſmall quantities of air, and therefore the reſults may not, in ſome reſpects, be ſo much depended upon. But I think it ſufficiently appears from them, that no water was formed in the proceſs, and this the new theory abſolutely requires. Much, however, remains to be done on the ſubject; and as I am now old and cautious, and Dr. Woodhouſe a young man, and more ardent in the purſuit, I recommend the proſecution of it to him.

I think it can hardly be denied that, conſidering the great quantity of inflammable air that diſappears in theſe experiments, the greateſt part of it, at leaſt, muſt enter into the calx. And ſince all running mercury muſt conſiſt in the ſame elements, the ſame principle that (with the addition of water) forms inflammable air, and which we call phlogiſton, muſt paſs through red hot glaſs, when the calx of mercury is revived without addition, by means of heat only.

Some experiments that I have lately made on *ſilver*, *gold*, and *platina*, favour this hypotheſis. All theſe metals give a conſiderable quantity of nitrous air when diſſolved; the firſt in nitrous acid, and the two laſt in aqua regia. And when the ſolutions were evaporated, and the dry reſiduums heated in inflammable air, a great quantity of it diſappeared, and the metals were revived; and yet, by means of the ſame acids, theſe dry reſiduums will yield a great quantity of nitrous air. They muſt, therefore, have acquired, by means of heat only, and this tranſmitted through a veſſel not red hot, the ſame principle that was communicated to them by imbibing inflammable air.

Dr. Woodhouſe ſays, p. 462, " If an ounce of mercury

" abſorbs 362 ounce meaſures of inflammable air, it ought to " give out this air when diſſolved in an acid, or ſome ſub- " ſtance into which it enters as a conſtituent part; but mer- " cury, revived from red precipitate by inflammable air, boiled " in ſulphuric acid, gives ſulphureous gas, and when added to " nitric acid, nitrous air; neither of which contains inflamma- " ble air."

But vitriolic acid air (for I muſt take the liberty to uſe my own terms), certainly contains the ſame principle with inflammable air; for it has the ſame effect on common air, and nitrous may actually be formed from inflammable air; for it is produced by heating the nitrated calx of any metal in inflammable air. If copper be diſſolved in nitrous acid, and the water be expelled to a certain point, there remains a *green ſubſtance* which is not at all deliqueſcent; but, when expoſed to heat, gives out a red vapour. Some of this ſubſtance I heated in 21 ounce meaſures of inflammable air, till the veſſel was filled with red vapour, when it was reduced to ſix ounce meaſures; and, I found that when it was mixed with common air, the ſtandard was 1. 55; ſo that it was almoſt wholly nitrous air. There was in it a ſmall quantity of fixed air, but nothing inflammable in it. It extinguiſhed a candle.

I have formerly endeavoured to aſcertain the proportion of phlogiſton in nitrous and inflammable air, and found it nearly the ſame in both. That this is not far from the truth may, I think, appear from comparing the reſult of two of my former experiments, which I never before thought of doing with this view. When I firſt diſcovered nitrous air, I endeavoured to find what quantity of it would be yielded by the different metals, and found that 20 grains of iron yielded 16 ounce meaſures. When, with other views, I endeavoured to aſcertain the quantity of inflammable air, yielded by malleable iron, I found that 120 grains of it yielded 96 ounce meaſures; and this is exactly the quantity of nitrous air that the ſame weight of iron will give; for 120 is to 96 as 20 is to 16.

Twenty grains of platina gave nine ounce meaſures of pure nitrous air, and 22 grains of gold gave eight ounce meaſures. They, therefore, contain nearly the ſame proportion of phlogiſton; for 20 is to 9 as 22 is to 9. 9. They, therefore, contain little more than half as much phlogiſton as iron; for it will be in the proportion of 170 ounce meaſures to the ounce. It is, however, more than is contained in lead, which

I found to be 108, but leſs than biſmuth, which is 185; and much leſs than mercury, which I made to be 362 ounce meaſures to the ounce.

With thanks for the indulgence with which you have favoured me, I am, Gentlemen,

Your very humble ſervant,

J. PRIESTLEY.

Northumberland, July 18, 1799.

ARTICLE IV.

Dr. Priestley's Reply to his Antiphlogistian Opponents.

No. II.

To the Editors of the Medical Repoſitory.

Gentlemen,

PRESUMING that you have received the firſt number of my reply to my opponents, I take the liberty to ſend a ſecond, not doubting your impartiality with reſpect to the diſcuſſion that I have propoſed.

1. Of ſome experiments relating to the conſtitution of metals, and of fixed air.

I have endeavoured to ſhew, by a variety of experiments, that when metals are calcined in atmoſpherical or pure air, ſomething which has obtained the appellation of phlogiſton is emitted from the metal, as well as that ſomething is imbibed by it; that this phlogiſton, uniting with part of the pure air, forms part of the phlogiſticated air that is found after the proceſs, and that, in ſome caſes, it alſo forms fixed air. This muſt neceſſarily be the caſe in ſome experiments with metals, which are not pretended to contain carbone, or plumbago, which are ſaid to be the only ſources of fixed air.

In order to refute my argument, Dr. Woodhouſe makes a compariſon between the calcination of *iron* and of *copper* in dephlogiſticated air. When he calcined 90 grains of bar iron he found an ounce meaſure of fixed air; but he ſays, p. 456, that after the experiment with *copper*, in which 16 ounce meaſures of pure air were reduced to 4, neither fixed nor phlo-

gisticated air was found, and that the remaining air was *perfectly pure.*

Now, as I had always found, that when I calcined any other metal over lime water, a thick scum never failed to be formed upon it, which shews the actual generation of fixed air, and for this purpose had tried *iron*, *zinc*, *lead*, *tin*, *bismuth*, and *regulus of antimony*, of which an account may be seen in your *Repository*, vol. ii. p. 266, I thought it unnecessary to repeat the experiment with any other metals. However, on receiving Dr. Woodhouse's answer, I tried some clean filings of *copper*, and had the same result. A thick scum was formed on the surface of the lime water, which proved the generation of fixed air in the process; and as 33 ounce measures of atmospherical air were, by this means, reduced to no more than 26, but completely phlogisticated, I think it probable that some phlogisticated air was likewise formed at the same time. For, according to M. Lavoisier, atmospherical air consists of 27 parts of dephlogisticated, and 73 of phlogisticated air; whereas my result is in the proportion of 78 of phlogisticated to 22 of dephlogisticated air.

That 16 ounce measures of any dephlogisticated air that Dr. Woodhouse could make should be reduced to 4, and the remainder be *perfectly pure*, must be impossible; because to make dephlogisticated air perfectly pure, is hardly possible; and all the impurities in the 16 ounce measures would be found in the remaining 4. The Doctor should have said by what means he ascertained the purity of the air before and after the experiment. I hope he will repeat it with all the attention that it deserves.

M. Lavoisier, as Dr. Woodhouse informs us, page 467, says, that "if pure iron be melted in pure air, no fixed air "will be formed." But this is contrary to my uniform experience, with either dephlogisticated or atmospherical air. Dr. Woodhouse now found an ounce measure of fixed air in 90 grains of bar iron, so that here he must join me in pronouncing M. Lavoisier's experiment to have been very inaccurate, unless iron in France be different from that in England or America.

This fixed air, Dr. Woodhouse says, page 456, is formed by "a small quantity of *coal*, which all iron of commerce con-"tains:" but an ounce measure of fixed air, from 90 grains of iron, is no small quantity. If malleable iron contain so much *plumbago* as will give this large quantity of fixed air,

it ought to be found when diſſolved in an acid. But neither is any ſuch fixed air found in the inflammable air produced in that proceſs, nor when it is decompoſed by means of dephlogiſticated air; ſo that there is no pretence whatever for ſuppoſing that it is held in ſolution in that inflammable air. That malleable iron contains any conſiderable quantity of plumbago is utterly improbable. It is equally untrue that *precipitate per ſe*, or the *red precipitate*, contains fixed air. It never appears but in its decompoſition with inflammable air, when they unite to make it, as I think I have abundantly proved.

Dr. Woodhouſe ſays, page 471, that in five attempts to get fixed air from iron filings and red precipitate, he never ſucceeded. To this I can only ſay, that with me the experiment has never failed. But this is only one experiment out of many that prove the ſame thing.

He likewiſe ſays, page 472, that the fixed air which I produced by heating charcoal of copper in dephlogiſticated air, is no proof of its being formed from that kind of air, becauſe *carbone* is one of the component parts of alkohol, by means of which the charcoal of copper is made. But, ſurely, he did not recollect that the fixed air, procured in this manner, weighs conſiderably more than all the charcoal employed; in fact, between three and four times as much, (ſee the laſt edition of my *Obſervations on Air*, vol. iii. p. 377.) and that there is nothing elſe preſent into which the dephlogiſticated air can poſſibly enter: for of the charcoal nothing viſible is left.

With reſpect to this experiment, the French chemiſts give a much better explanation: for, they ſay that fixed air is carbone, diſſolved in dephlogiſticated air; and they make the proportion of each of the ingredients the ſame that I do. They only ſubſtitute their *carbone* in the place of phlogiſton.

Dr. Woodhouſe, after finding half an ounce meaſure of fixed air, in melting half a drachm of bar iron in 20 ounce meaſures of dephlogiſticated air, when 13 ounce meaſures of it were abſorbed, ſays, p. 467, "Certainly Dr. Prieſtley will "not ſay, that 13 ounce meaſures of dephlogiſticated air enter "into the compoſition of half an ounce meaſure of fixed air, "which muſt be the caſe if his theory be true." But Dr. Woodhouſe ſhould recollect, that, according to my theory, the greateſt part, if not the whole, of the *weight* of moſt kinds of air is water; and, therefore, when iron, by being converted into finery cinder, has got all the water from the 20 ounce meaſures of air, the oxygen contained in it may very well, for any

thing that appears, enter into the compoſition of half an ounce meaſure of fixed air; and one half the weight of this kind of air, I have clearly proved to be pure water.

I am, Gentlemen,

Your very humble ſervant,

J. PRIESTLEY.

Northumberland, July 24, 1799.

ARTICLE V.

Dr. Priestley's Reply to his Antiphlogistian Opponents.

No. III.

To the Editors of the Medical Repoſitory.

Gentlemen,

THIS letter will cloſe my reply to Dr. Woodhouſe, and I fear I ſhall not ſoon meet with another opponent ſo candid as he has ſhewn himſelf to be: I therefore hope that he will reſume the diſcuſſion ſo favourable to the diſcovery of truth.

1. Of the Calx of Mercury.

In order to invalidate my argument from a certain calx of mercury requiring to be heated in inflammable air, or in contact with ſome other ſubſtance ſuppoſed to contain phlogiſton, for its revival, Dr. Woodhouſe ſays, page 455, "It does not "follow that becauſe the ſulphate of mercury requires to be "deprived of its ſulphuric acid before running mercury can "be procured from it, that, therefore, all mercurial calces "require the addition of phlogiſton to be converted into mer-"cury."

But the Doctor does not ſeem to underſtand my argument, and, therefore, I ſhall ſtate it more diſtinctly. I find, no matter by what means, a certain calx of mercury, combined, I acknowledge, with ſome other ſubſtance; but ſince heat alone will not revive it, but heating it in inflammable air does revive it, while that air diſappears in the proceſs, it is natural to conclude, that ſomething contained in the inflammable air enters into the calx, and contributes to the revival of it, beſides ex-

pelling the other ſubſtance with which it was united; unleſs it can be made to appear that this inflammable air can be found united to ſomething elſe.

This is ſimilar to the caſe of finery cinder, a ſubſtance which, in my opinion, conſiſts of the calx of iron united to water, which cannot be expelled but by the introduction of phlogiſton to ſupply its place. In this caſe the antiphlogiſtians ſay that the inflammable air which diſappears aſſiſts in forming *water*, an opinion which, I think, I have ſufficiently refuted. I now aſk, what becomes of it in the revival of this calx of mercury, in which no water is found? I therefore ſay, that if inflammable air, or the phlogiſton contained in it, be a neceſſary component part of this particular piece of iron, or of this particular portion of mercury, it muſt be a neceſſary ingredient to the conſtitution of iron and mercury in general.

2. Of Finery Cinder.

Dr. Woodhouſe confirms my experiment of the abundant production of inflammable air from heating dry finery with dry charcoal; but he ſays, p. 465, the iron is not revived. I muſt, however, take the liberty to ſay, from my former experiments, that the iron is completely revived in this proceſs; and I made the experiment too often to be miſtaken. On this ſubject I ſay, *Obſervations on Air*, vol. vi. p. 375, "This (i. e. the revival of iron from finery cinder) is effected in the moſt "complete manner by heating it with a burning lens in inflammable air. But it is likewiſe done by cementation with "charcoal, coak from pit coal, or raw coal. In all theſe "proceſſes the finery cinder loſes about one third of its weight, "and is then perfectly ſoluble in acids, and attracted by the "magnet. Conſequently it is perfect iron. Iron thus made "is partially malleable."

Dr. Woodhouſe ſays (Med. Rep. vol. ii. p. 401), that I ought to have remembered that this ſubſtance cannot be revived in one of Lewis's ſmall black furnaces. But where does it appear that I ever knew what he expects me to remember. If this furnace will not anſwer the purpoſe, let more heat be applied. My brother-in-law, Mr. Wilkinſon, has converted many tons of finery cinder into iron in his ſmelting furnaces.

He ſays that my explanations of this experiment will not account for the formation of the fixed air which is formed a-

the ſame time. But I maintain that charcoal itſelf contains all the elements of fixed air, ſince it is produced from it when it is heated in ſteam: and it is ſurely ſufficient, if any hypotheſis be conſiſtent with itſelf, though not with concluſions from other theories.

If Dr. Woodhouſe will look into my account of the analyſis of different kinds of inflammable air, he will find that the fixed air procured from the decompoſition of that which is procured in this proceſs, muſt be compoſed, in part, of the pure air in which it is fired; becauſe the weight of this fixed air exceeds that of the inflammable air that is employed.

This is the "carbonated hydrogen gas which," Dr. Woodhouſe ſays, page 465, "is formed by hydrogen of the water "in the finery cinder diſſolving part of the coal; while its oxy-"gene unites with another part of the coal, and makes fixed "air." This ſame coal, or *carbone*, I cannot help obſerving, is a wonderfully convenient ſubſtance, forming whatever the theory requires that it ſhould do. But to ſuppoſe, as Dr. Woodhouſe does, that finery cinder contains water, and ſo much of it as is neceſſary to form all this air, both inflammable and fixed, is to abandon the moſt fundamental principle of the new theory, which requires water to be decompoſed in paſſing over hot iron, the oxygene alone remaining in the iron, and the hydrogen eſcaping in the form of inflammable air. And it is only by comparing the addition of weight to the iron that the proportion of the oxygene and the hydrogen in water is aſcertained. Whereas, according to Dr. Woodhouſe, there muſt be nothing, or next to nothing but mere water in the finery cinder, which accords with the doctrine of phlogiſton, and no other. Beſides, how can that which is attached to the iron be water, when its hydrogen has been ſeparated from it.

Thus does Dr. Woodhouſe take from the new theory one of its neceſſary ſupports, viz. the *decompoſition* of water. There only remains the argument from its *compoſition*, by burning inflammable in dephlogiſticated air. But when an hypotheſis ſtands only on *two* legs, and one of them is taken away, it muſt be left very lame.

3. Of the Formation of Nitrous Acid.

Dr. Woodhouſe, not finding more than three grains of nitrous acid from the decompoſition of 56 ounce meaſures of

dephlogiſticated air, ſays, p. 474, "the theory of Dr. Prieſtley muſt certainly be wrong; for it is not probable that 56 "ounce meaſures of dephlogiſticated air ſhould enter into the "compoſition of three grains of nitrous acid." But the acid thus formed is ſo highly phlogiſticated, and diffuſed through ſo large a ſpace, that it is no wonder at all that no more of it ſhould be collected. In this ſtate water retains it very imperfectly. But that even three grains, or one grain, of the acid ſhould be formed from the exceedingly ſmall quantity of phlogiſticated air which could not be excluded in ſome of my experiments, is abſolutely impoſſible. In ſome of them, I am confident, it was an hundredth, or a thouſandth part of a grain in weight, when the acid I collected was ſeveral grains.

Let any perſon attend to the laborious experiments of Mr. Cavendiſh, on the decompoſition of a ſmall quantity of phlogiſticated air, and ſay whether it be credible that ſo much nitrous acid could be produced from any quantity of phlogiſticated air by a ſingle exploſion in this way, when it required thouſands of exploſions in his.

I think I have noticed every thing of much conſequence in Dr. Woodhouſe's publication. Somewhere, however, he ſays, that manganeſe was not revived, though ſome inflammable air in which it was heated diſappeared. But ſeveral calces imbibe much inflammable air, or phlogiſton, before they are completely revived; and the metal of manganeſe is not procured without great difficulty in any proceſs.

With thanks for your continued indulgence,

I am, Gentlemen,

Your very humble ſervant,

J. PRIESTLEY.

Northumberland, July 26, 1799.

☞ The reader will be pleaſed to correct the following ERRATUM, juſt diſcovered, in a former communication of Dr. Prieſtley's.

Vol. ii. p. 265, line 10 from the bottom, for "the" read *though*.

ARTICLE VI.

Obſervations on the YELLOW FEVER, *as it appeared at Wilmington (Delaware) in the Summer and Autumn of* 1798: *Communicated in a Letter from* JAMES TILTON, *M. D. Preſident of the Medical Society of Delaware, to Dr.* MILLER.

Wilmington, (Delaware) June 18, 1799.

Dear Sir,

IN contemplating ſo dreadful a calamity as the yellow fever, it ſeems to be incumbent on every man to contribute his mite for the protection of ſociety againſt its ravages. The correct information received through the medium of the Medical Repoſitory has ſuggeſted, that in return for the uſeful hints and obſervations from others, we ought to give ſome account of this peſtilential epidemic, as it appeared among us.

The manner in which I am obliged to diſſipate my time, in ſubſerviency to a ſhattered ſtate of health, has hitherto prevented me from writing to you on this ſubject. I hoped too, that ſome report of our committee of health might have ſaved me the trouble; but in this I have been diſappointed.

As the ſeaſon is now approaching, when our country will again run the riſk of this ſcourge of mankind, I have haſtily thrown together ſome thoughts on this ſubject, to be diſpoſed of as you ſhall think proper. Without dwelling long on the hiſtory of the diſorder, or waſting time in fine-ſpun theories, I ſhall confine myſelf to ſome practical obſervations, which, I apprehend, have not been duly regarded by others.

At Wilmington we have no apprehenſion of domeſtic origin. Every medical character, in this place, takes it for granted, that the diſeaſe was imported from Philadelphia, and no otherwiſe created. It appeared to me alſo, that infected houſehold goods and furniture, brought from the city, by our ſhallops, had more influence in ſpreading the contagion, than diſeaſed perſons: for it was very remarkable, that the diſeaſe was not communicated from the firſt perſon who died of it, and who came down and ſickened in the land ſtage. But, when the fever became epidemic, it took riſe at the water's edge, and infected all, or with few exceptions, gradually

up to High-ſtreet. Above this, the town is more thinly built, and the caſes were ſolitary as in the country.

Although the diſeaſe made its appearance among us, in the beginning of Auguſt, we hoped for our uſual exemption, until near the middle of the ſame month, when the epidemic nature of it appeared ſo manifeſt that a committee of health were appointed, and a ſlight hoſpital arrangement was conſtructed, for the relief of the poor and neceſſitous. Soon afterwards the principal phyſicians of the borough were called upon for their advice; and, with a view of obtaining the greater maſs of information, the committee requeſted them to report individually, rather than collectively. By this time, however, my brethren were ſo diſordered, in their perſons or families, that they could do little more than make an apology for their non-compliance. With great difficulty, under the moſt diſtreſsful interruptions, I found means of preſenting to the committee the following

"REPORT.

"Gentlemen,

"THE cauſe of humanity operates ſtrongly upon my mind, in concert with the reſpect due to the Committee of Health for the borough of Wilmington, to make the beſt Report in my power, relative to the moſt expedient and uſeful hoſpital arrangements, for the accommodation of ſuch unfortunate perſons, whether foreigners or native citizens, as may ſtand in need of an aſylum during the preſent contagious epidemic. I wiſh, indeed, that the ideas now ſuggeſted, may be worthy of regard, not only at the preſent time, but that they may ſerve as a baſis to build upon, on all future occaſions, which, in the events of providence, may require ſimilar proviſions.

"It might be expected, that one of the firſt objects in a Report of this ſort, would be relative to the excluſion of contagion from among us. How far the exiſting laws put it in our power to take meaſures of this ſort, will deſerve the deliberations of the committee; and the phyſicians will be always ready to aſſiſt them, with all the information they poſſeſs relative to this point. But regarding the Yellow Fever as already amongſt us, we ſuppoſe it more immediately neceſſary to report a convenient hoſpital arrangement; and this is as much as can be accompliſhed within the time to which we are limited.

"The firſt point I ſhall ſuggeſt to your conſideration is the moſt proper ſituation for an hoſpital. Where it now ſtands, in my apprehenſion, is the moſt improper place that

could be chofen. On the fouthern fide of a hill, rifing for a great extent into a mountain, the heat of the air muft be increafed; and the fouth-weſterly winds, which prevail during our hotteſt weather, muſt waft the poiſonous effluvia, exalted in their malignity, over the town. A ſituation northward or eaſtward of the borough would be much preferable. The prevailing ſouth-weſt wind would then carry every ſpecies of exhalation, ariſing from the hoſpital, in a direction from the town; and the cooler breezes from the north and eaſt, when they happened, would be without hazard, as the exhalations would be little or none at all, and in no degree exalted as by the ſcorching ſouth-weſt. If, moreover, a ſituation could be obtained, where all the offal of the hoſpital could be emptied into the waters of the Chriſtiana or Brandywine, it would contribute greatly to cleanlineſs; and the courſe of thoſe rivers would give a refreſhing current to the air, which cannot be expected in the preſent ſituation of our hoſpital, under cover of a mountain.

"The next article to which I ſhall call your attention is the importance of earthen or ground floors, in all caſes where contagion is to be ſuſpected. This point I regard as fundamental and eſſential. You will, therefore, bear with me, while I dilate ſomewhat upon this ſubject: and when you reflect that I have ſerved ſeven years in contagious hoſpitals; that during the whole of that period it was never my lot to be a mere parade officer; that I always ſtood at the poſt of duty, which was alſo the place of obſervation;—you may reaſonably ſuppoſe I ought to have ſome confidence in the opinions and advice which, at your requeſt, I now ſubmit to your diſcretion.

"The grave-yards of this place may call to your recollection the deſtructive nature of the contagion which exiſted in the hoſpitals of the American army. This uſed often to be the ſubject of converſation, as the Yellow Fever now is. In a diſcourſe which I had with a New-England officer, reſpectable for his age and former ſervices, he mentioned, that the celebrated general, Count Saxe, had noted in his Memoirs, or Reveries, that ground floors were much more ſalubrious in military hoſpitals than thoſe made of wood or plank. The obſervation ſtruck me with great force. It immediately occurred to me, that we purified clothing and furniture from infection of every kind, by burying them in the earth; and that putridity, ſo commonly connected with the idea of contagion, was, in like manner, abſtracted from all ſubſtances whatſoever.

From this time forward, I was led to remark the great ſucceſs of tents, in compariſon of churches, barns, &c. when employed as hoſpitals. A houſe, with a plank floor, never failed to become contagious in a ſhort time; ſo that men who entered the hoſpitals for trivial complaints, often died of the contagion. I need ſcarcely obſerve, that diſorders, bad of themſelves, were aggravated by ſuch contagious places of reſidence. In the winter, however, it was impoſſible to employ tents. I, therefore, in the hard winter of 1779 and 1780, while the army was cantoned on the mountains near Morriſtown, with much difficulty, found means of building an hoſpital at Baſkingridge, with no other flooring than the common ſurface of the ground; without a chimney, the fire was made in the middle of the ward, and the ſmoke paſſed through a funnel in the middle of the roof. My ſucceſs was equal to my moſt ſanguine expectation. This houſe was free from contagion, while the barns and out-houſes of the neighbouring farms, though leſs crowded, manifeſted the uſual misfortune. Dr. Ruſh, in one of his Eſſays,* takes notice of the ſucceſs of this hoſpital. As well as I recollect, he adverts principally to its advantageous mode of ventilation. But, I am perſuaded, it could not have eſcaped the contagion, if the floor had been of wood. Long details might be added to this ſhort hiſtory, to eſtabliſh the advantages of ground floors.

"But if a caviller at this doctrine ſhould contend, that the contagion of camp fever, dyſentery, &c. the uſual attendants upon armies, is ſpecifically different from that of Yellow Fever, I anſwer, it matters not; becauſe, in each and every caſe, a ſhip and wooden houſe are moſt noxious devices for imbibing and exalting the contagion; while, in every caſe, likewiſe, we bury clothing and furniture in the ground, as the moſt effectual means of purification.

"If theſe premiſes are admitted, the arrangement I ſhall now propoſe, follows of courſe, viz.

"That the hoſpital ſhall be eſtabliſhed on the northern or eaſtern ſide of the borough, on the Chriſtiana or Brandywine, as ſhall be found moſt expedient and convenient.

"That, inſtead of a houſe, TENTS, of the ſize of the ordinary horſeman's tent, ſhall be provided for the ſick; one to be appropriated to every patient. The horſeman's tent opens advantageouſly on every ſide, for the admiſſion of air. Every

* An Account of the Bilious Yellow Fever in 1794.

tent that has been once uſed, ſhould be thrown down, and ſoaked in water, before it is again employed. Thus every patient will be freed from all the dangers proceeding from his fellow ſufferers, as well as from himſelf.

"That no houſe will be neceſſary, but a kitchen to cook in, unleſs our misfortunes ſhould be extended to the cold weather; and then a ſlight building of any ſort, with a ground floor, a funnel in the middle of the roof, and no chimney, after the example of Baſkingridge hoſpital, for the reception of patients in a ſtate of great frailty, at night only, might ſuffice. For permanent uſe, it would be better to have the walls plaſtered, ſo as to be occaſionally white-waſhed. When the weather permits, a little fire might be kindled in the middle of the floor; and the patients lying round on every ſide, with their heads to the wall, would have their feet towards the fire. The ſmoke circulating through the upper parts of the ward would purify the air, and paſs off through the funnel, without inconvenience to the ſick. Every ſide of the building ſhould be capable of opening widely, and cloſing again, as the ſun, wind and rain may require. The ground floor will, above all things, protect from contagion. When any change or renovation ſhall be required in this, the old ſurface may be ſcraped off, or a new one put on.

"Upon this plan it is alſo manifeſt that the expenſes may, from day to day, be readily accommodated to the exigencies of the occaſion; a difficulty that has been lamented in other places.*

"In ſhort, the frugality and practicability of this meaſure are equally apparent; and I can aſſure the committee, that much experience ſatisfies my mind of its great utility. Who would not, indeed, rather truſt himſelf in a tent, where the friendly winds waft away the poiſonous exhalations, and our kind mother earth lends her aſſiſtance in abſorbing every noxious diſcharge from the body, than in a confined room, where the air we breathe muſt be charged with contaminating poiſon, and the plank floor, reverberating, as it were, the effluvia of the patient upon his own body, muſt operate as a perpetual ſource of injury?

"Could the doctrine I have endeavoured to eſtabliſh be put to the proof, and the public mind ſatisfied of its truth and validity, inſtead of that reluctance to go to the hoſpital which

* At Baltimore particularly.

we now obſerve, every man of common ſenſe would fly to it as to a city of refuge. Phyſicians and nurſes would attend with confidence; and it would be eaſy to baniſh from our towns any contagious ſickneſs.

" It may not be impertinent to obſerve, that when imperious circumſtances require thoſe who are well to leave their habitations, they might, as well as the ſick, take advantage of tents, by forming an encampment near their ordinary place of reſidence. This would certainly be better than to fly, in terror, over the whole face of the country. The Governor of Pennſylvania has, on a former occaſion, ſet the example, and, I ſhould ſuppoſe, others might profit by doing ſo likewiſe.

" Theſe, Gentlemen, in my opinion, are the great outlines which demand your immediate attention. Secondary objects, ſuch as bedding, furniture, the internal government and management of the hoſpital, may be further regarded in due time.

" With great reſpect,
" I am, Gentlemen,
" Your moſt obedient ſervant,
" JAMES TILTON.

" COMMITTEE *of* HEALTH *for the* Borough *of* Wilmington.
" *Wilmington, September* 6, 1798."

In this report, you will perceive, I have not attended to the critical diſtinction between *contagion* and *infection*, but have rather conformed to the prevailing impreſſion at the time; for every body, at Wilmington, ſuppoſed the diſeaſe to be *ſpecifically contagious*. The highly offenſive ſmell proceeding from the patients, ſo as to characterize the diſeaſe, and often to affect the ordinary ſenſe of ſmelling, at a much greater diſtance* than that to which the contagion is limited by Dr. Chiſholm, contributed not a little, with the rapid ſpread of the fever, to give this general impreſſion.

At the ſame time that, in this fever, all our ſenſes are ſtrongly impreſſed with the idea of contagion, proceeding immediately from one perſon to another, it muſt be confeſſed, it has ſome characteriſtics in common with infectious diſor-

* Ten feet.

ders. Like the jail fever, dyſentery, &c. the contaminating poiſon of the Yellow Fever may be exalted through all the grades of malignity, by external circumſtances, free from all connection with diſeaſed bodies. Hence it is not ſurprizing, that phyſicians of the greateſt eminence ſhould deem this fever both contagious and infectious. I mention theſe things, not with deſign to enter into controverſy, but to ſhew that, in each and every caſe, whether contagious, or infectious, or both, the practical obſervations, which I have to offer, are equally applicable.

If the contaminating poiſon of Yellow Fever adheres as tenaciouſly to wood as to cotton or wool; and, by a permanent connection of this ſort, it becomes more and more exalted in its malignity; if the common earth manifeſts a capacity for attracting this kind of poiſon, abſtracting it from other ſubſtances, and neutralizing or correcting it, ſo as to render it totally inoffenſive; it would require more than a ſhort eſſay to give a full view of the extenſive application of this principle in medical practice.

When the Yellow Fever rages, the principles which I have adopted would direct every human creature, both ſick and well (a neceſſary watch or guard excepted), to quit the infected city or town, and encamp on the open plains. The ſick ſhould carefully avoid plank floors to their tents, and lie upon cots or bunks, with their legs ſtanding upon a freſh ſurface of the ground, or a graſs ſod. The lazarettos, now ſo generally in contemplation, ſhould conſiſt chiefly of a well choſen, high, dry, and extenſive plain, and a plenty of horſemen's tents; a rivulet running through or by it would be of great advantage. Such houſes as might be deemed neceſſary, ſhould be built as deſtitute of wood as poſſible; and wards, deſtined for the ſick, ſhould have ground floors, with a fire place in the midſt, and be ventilated through a funnel in the middle of the roof, as deſcribed in the foregoing report. When our ſhips or veſſels, with their crews, become infected, they ſhould make the firſt port, and encamp all hands on ſhore, until the men are recovered, and the veſſel thoroughly cleanſed. When, by any misfortune, the infection ſhall have crept into any of our trading towns, it may be expedient to cover a ſmall part of the ſtreets, where the infection firſt manifeſts itſelf, with freſh earth, rather than ſcrape the pavements bare, by which means the heat of the atmoſphere is exalted to intemperature, and all abſorption prevented. Might not patients employ the

ground bath to advantage? And will not a multitude of advantages occur to every practitioner, as soon as the principles I have laid down shall be established by common consent?

Science contributes not a little to illustrate our subject. The contagious matter of the plague is deemed heavier than the common atmosphere; and, therefore, has a constant tendency to the earth. The poison of Yellow Fever, upon due investigation, would probably be found to possess the same quality. We can readily conceive, too, of an elective attraction between the constituent principles of common earth and the gaseous poison of yellow fever, whereby a *tertium quid* may be produced that is totally inoffensive. In no case, perhaps, would Professor Mitchill's doctrine of *septon* more advantageously apply. But I am not ambitious of multiplying words. My object is only to sketch an outline, which, if well received, will soon be filled up with the requisite comments, by men of more talents and more leisure than are at my disposal.

I will only add, that the little hospital of this place serves as a pointed evidence in proof of the doctrine advanced. The board of health, regardless of my advice, neglected to remove their hospital, and admitted the first patient into a small house they had provided, floored with plank, and built totally of wood. It soon became apparent, that every patient placed in this house died of course. A child of five years old, whose father and mother had died of the fever, was put into one of the tents, because it had no other place of accommodation. This child, inadvertently strolling to the wooden house, was seized with a tremulous agitation of the whole body; a violent fever instantly succeeded, and the child died in three or four days. So manifest was the noxious influence of this wooden building, that the patients were induced to desert it utterly, and remove their safer tents to the utmost distance permitted by the limits to which they were confined. The nurses, and other attendants on the sick, who were quartered in tents, all escaped the infection.

I am, dear Sir,

Your friend and humble servant,

JAMES TILTON.

ARTICLE VII.

Remarks on the EPIDEMIC *of the Summer and Autumn of* 1798, *at Wilmington: Communicated in a Letter from* GEORGE MONRO, *M. D. to Dr.* MILLER.

Wilmington (Delaware), June 20, 1799.

Dear Sir,

THERE is nothing I can afford, from this place, reſpecting the epidemic of laſt feaſon, differing in ſubſtance from more important communications already publiſhed in your very uſeful Repoſitory. But I ſhall, for the ſake of general information, agreeably to your requeſt, endeavour to furniſh you with a few remarks reſpecting the Yellow Fever, as it occurred here the laſt ſeaſon.

The firſt caſe of this diſeaſe happened in the beginning of Auguſt. The infection was evidently traced to a diſeaſed veſſel in Philadelphia, on board of which the perſon had been, as he was about renting a houſe in that part of the city where this veſſel lay, and where the fever firſt and principally prevailed. He ſickened on the road, coming home, grew very ill immediately on his return, and died in a few days. None of the family afterwards ſuffered from his illneſs.

Very ſoon after this, all that part of the town connected with the wharves became diſeaſed. The upper and high parts, where the houſes were thinly built, ſuffered very little. Notwithſtanding the inhabitants very generally went into the country, the fever continued to increaſe in its ravages among the remaining citizens, till it received a check by the operation of cool weather. The laſt cafe I recollect happened on the 6th of November.

In this fever, all the forms mentioned by various writers appeared, viz. from the loweſt grade of febrile affection to the moſt violent and inflammatory. One inſtance occurred of a child dying with the ſtrongeſt ſymptoms of convulſive ſpaſm. The practitioners of eſtabliſhed reputation here unanimouſly agreed upon the beneficial effects of mercury. Blood-letting was frequently required; but a free evacuation of the firſt paſſages, followed by mercury, was moſt univerſally uſeful. I have ſeen ſeveral inſtances where ten grains of calomel, and fifteen of jalap, ſeemed to carry off all the

ſymptoms, when given upon the commencement of attack. Where the mouth could be made ſore with mercury by the third or fourth day, I do not recollect any inſtance of mortality, unleſs in one caſe, where the patient had before ſuffered from a long continuance of ſyphilitic affection.

The great mortality experienced here principally aroſe, in my opinion, from the neglect of proper remedies. An unhappy prejudice was generally diffuſed, by ſome French characters, againſt the uſe of mercury. The inhabitants conceiving, I ſuppoſe, that ſuch perſons muſt neceſſarily be more converſant with this novel affliction than their own phyſicians, were, of courſe, more diſpoſed to reſpect their counſel. One of theſe gentlemen, bearing the name of a ſurgeon, was entruſted with the care of the ſick who were removed to the ſuburbs of the town; and, as his treatment of their complaints was chiefly confined to gentle laxatives, manna, I believe, and barley-water, you may readily judge how incompetent theſe would be found to encounter ſo formidable a diſeaſe.

Great benefit was obtained from alkaline remedies in relieving the diſtreſſing cardialgia, which, in ſo many inſtances, was the fore-runner of black-vomiting. But where free evacuations, in the firſt inſtance, were neglected, even with a liberal uſe of mercury afterwards, little good could be expected from any medicine.

One inſtance of pregnancy, as far advanced as the ſixth month, with conſiderable determination to the head, as evidenced by great inflammation of the eyes, ſtupor, &c. recovered. The patient was blooded ſeveral times, and highly ſalivated on the fourth day from the attack. This caſe was peculiar, from vomiting a large quantity of very dark coloured matter in the early ſtage of the diſeaſe, which was ſucceeded by profuſe ſweating. The diſcharge from the bowels was very inconſiderable. Would not ſuch inſtances very much encourage the uſe of full vomiting, in the firſt approach of this dreadful enemy?

Several caſes of convaleſcency put on dyſenteric ſymptoms at the cloſe of the ſickly ſeaſon.

Accept this ſhort ſketch; and believe me to be, with beſt wiſhes for the ſucceſsful continuance of your very laudable and highly important undertaking,

Moſt reſpectfully yours,

G. MONRO.

ARTICLE VIII.

A Letter from JOHN MACLEAN, *M. D. Profeſſor of Mathematics and Natural Philoſophy in the College of New-Jerſey, in Anſwer to one addreſſed to him by* JAMES WOODHOUSE, *M. D. Profeſſor of Chemiſtry in the Univerſity of Pennſylvania.*

College of New-Jerſey, June 15, 1799.

SIR,

THE fourth number of the ſecond volume of the Medical Repoſitory has been ſent to me, and I am happy that you have called my attention to ſeveral important points in chemiſtry, on which you believe my aſſertions are abſolutely erroneous.

In my examination of Dr. Prieſtley's conſiderations on the doctrine of phlogiſton and the decompoſition of water, I made free with his opinions, becauſe I conſidered them as unwarranted and contradictory; and I condemned many of his experiments, becauſe I was ſatisfied they were inaccurate, and that as well from my own experience, as from comparing them with others, made by himſelf and the French chemiſts.

It ſeems, however, that for ſeveral particulars you are inclined to think I had no right to do ſo; and you tell me I am not yet "the conqueror of this veteran in philoſophy." Now, it is to remove the unfavourable impreſſion which my obſervations have made upon you, that I uſe the freedom to trouble you with this anſwer, and I hope you will not refuſe your attention to it.

In the firſt place, ſuffer me to aſſure you, I am far from pretending to be ſuch a conqueror. Although I could have related many experiments of my own, yet, as they were chiefly repetitions of what had been done before, I gave the original authorities; ſo that it is plain, had I ſuppoſed any conqueſt was to be gained, or any honour to be reaped, I was determined it ſhould be by thoſe who were moſt juſtly entitled to it. Indeed, I am, on all occaſions, ready to acknowledge my inability to cope with Dr. Prieſtley. He can write faſter than I can think, and experiment faſter than I can write. But although I be deficient, it may not be ſo

with others. You are said to have written an answer to the Doctor, and who knows that the important conquest may not be in reserve for you?

The first particular you allege against me is the having agreed with the French chemists, that turbith mineral is an oxyd of mercury; and the having asserted, that any substance into which its mercury may be converted by a red heat, does not require any addition to constitute it a metal: and, after having told me the contrary of this is true, you mention several circumstances, which prove that the turbith is a sulphate of mercury.

Be so obliging as to look over the eleventh page of my lectures; you will there find a reference to the 305th page of the tenth volume of the *Annales de Chimie*. It was published in the year 1791; but as it is possible you may not have had an opportunity of consulting that work, permit me to present you with the following extract:

"Quelques chimistes ont pensé," says Mr. Fourcroy, "que le turbith minéral n'étoit qu'un oxide de mercure, et "qu'il ne contenoit pas d'acide sulfurique. Mais l'opinion de "Rouelle sur cette matière est confirmée par mes experiences. "Car en traitant le turbith le plus lavé et le mieux desséché, "par l'acide muriatique, la dissolution precipite du sulfate de "baryte par le muriate de baryte, à la vérité, beaucoup "moins que le sulfate de mercure neutre dont nous avons "parlé plus haut. Je l'appellerai donc *sulfate de mercure* "*avec exces d'oxide, ou sulfate de mercure jaune.*"

From this it appears, Mr. Fourcroy, one of those who are usually called the French chemists, had ascertained, about eight years ago, that turbith mineral is really a sulphate of mercury, and, in consequence, had given it an appropriate name.

Now, take the trouble to turn to the twelfth page of my lectures. It is there said, expressly, the substance obtained from turbith mineral by heating it, is different from an oxyd of mercury. To be sure, I gave a quotation from Fourcroy's Elements, in which the turbith was called an oxyd; but the reference to the Annales de Chimie, which were published long after the Elements, and my declaration, were subsequent to the reading of that quotation; and, considering the subject then in question, it was not necessary to be more explicit. Besides, the lectures you have seen were merely supplementary; and I had, on a former occasion, told my class, that turbith

was compoſed of an oxyd of mercury, and ſulphuric acid. You were miſtaken, then, in imputing, either to the French chemiſts or to me, the opinion, that turbith is a ſimple oxyd of mercury.

In the firſt experiment I made on the effect of a high temperature, on turbith mineral, about two drams of it were put into a glaſs tube, ſhut at one end; and this being placed among burning charcoal, the other was thruſt under a jar filled with and inverted into mercury. The turbith ſoon became of a deep red colour; oxygen and ſulphurous acid gaſes paſſed into the jar; and running mercury, with a white ſubſtance cloſe by it, collected in the tube. On the tube being removed, that part of it where the turbith had been put was found empty.

Being puſhed a little farther into the fire, the white ſubſtance became yellow, and afterwards red; it then melted and boiled; the mercury removed to another part of the tube; oxygen and ſulphurous acid gaſes eſcaped; and, on the red ſubſtance being diſſipated, the tube was again removed, and a little of a white ſubſtance was found cloſe by the mercury, though, as before, nearer the fire.

The tube was puſhed into the fire for ſeveral times ſucceſſively, and always with a like effect; the mercury increaſing, and the white ſubſtance diminiſhing in quantity, until, at laſt, it could not exceed the fourth part of a grain; and then, on account of the ſhortneſs of the tube, the operation was diſcontinued.

It was from the reſult of this experiment that I informed my pupils, about four years ago, as may be ſeen from the notes now in poſſeſſion of ſome of them, that turbith mineral might be entirely reſolved into oxygen gas, ſulphurous acid, and running mercury. It was from the ſame experiment I agreed with the French chemiſts, and concluded, that the mercury in turbith mineral, or any ſubſtance into which it may be converted by a red heat, does not, to uſe Dr. Prieſtley's phraſe, require any addition to conſtitute it a metal. And, having tried it over and over again, I do, with the moſt perfect confidence, inſiſt, you were wholly wrong in telling me the contrary of my aſſertions was true.

You proceed to remove what you ſuppoſed might be alleged againſt turbith mineral being a ſulphate of mercury; and you ſay, when it is expoſed to a red heat, "the ſul-" phuric acid leaves one part of it, and joins to another,

"which ſublimes in the form of a white ſalt. That part "which the acid deſerts is converted into an oxyd, is revived "without addition, and yields pure air." Next you inform me, the white ſalt, or ſulphate, is the calx which Dr. Prieſtley ſuppoſes incapable of reduction without addition; and that it is ſometimes mixed with cinnabar, and hence has a red colour. And you then remark, I ſhould have aſcertained all this had I intended to acquire the character of an accurate inveſtigator.

My lectures were not written with a view to acquire ſuch a character: it is more than probable I do not deſerve it. But, from the obſervations which I have made, I cannot help thinking, there is more of opinion than of fact in what you have ſaid.

It is true, when turbith mineral is heated, a quantity of white ſulphate of mercury is obtained; but it is not ſo certain that this ſulphate is the ſubſtance alluded to by Dr. Prieſtley, nor that the red colour, which he ſays it always has, is owing to an admixture with cinnabar.

A quantity of the white ſubſtance obtained in the experiment with the turbith being collected, the part of it which had been neareſt the fire was ſlightly yellow, while that which had been fartheſt from it was white.

Some of it, being thrown into warm diſtilled water, afforded turbith; and the fluid, being filtered, yielded a precipitate on the addition of pure potaſh.

Another portion being put into a glaſs tube, ſhut at one end, and placed on live coals, became yellow, then red, and melted. The tube being withdrawn, it changed to a ſolid, which was at firſt yellow, but which gradually turned nearly white. Being ſet again on the fire, the colour altered as at firſt. The whole melted, boiled, and diſengaged ſulphurous acid and oxygen gaſes; then ſome mercury appeared in the tube; a little ſulphurous acid was again emitted; and a white ſubſtance, and cloſe by it a red coloured fluid, collected in the tube: at length the whole of the ſubſtance put into the tube was diſſipated.

On the tube being removed, the red fluid turned ſolid, and was at firſt yellow, but afterwards almoſt white. The mercury, being ſcraped with a glaſs rod, was ſhaken out; and the white ſubſtance, being puſhed to the bottom of the tube, was heated, and afforded the ſame products as at firſt. And

this operation being repeated ſeven or eight times, the whole was reſolved into mercury, and the gaſes above-mentioned.

After conſidering all theſe phenomena, I concluded,

1. The white ſubſtance from the turbith was a ſulphate of mercury, and of the ſame ſort as may be got by boiling ſulphuric acid with mercury, and heating the mixture till the ſuperfluous acid is driven away.

2. Its red colour was dependent on the temperature to which it was expoſed.

3. It was formed in conſequence of ſulphuric acid and mercury diſengaged from the turbith, and meeting, when in vapour, at a temperature favourable for their action on each other.

4. It was depoſited on a part of the tube where the temperature was not ſufficient to decompoſe it.

5. The ſulphurous acid gas which firſt appeared, was owing to the decompoſition of ſome of the ſulphuric acid in the ſalt.

6. The oxygen gas and mercury proceeded from the decompoſition of the oxyd of mercury: and,

7. The ſecond portion of the ſulphurous acid gas followed on the action of the ſulphuric acid, and the mercury when in vapour.

I am the more inclined to think, the ſulphate was formed in the manner juſt mentioned, from its being ſo eaſily decompoſed. If it had ſublimed ready formed from the turbith, it ought, when expoſed to the ſame temperature, to have riſen again without alteration.

It does not ſeem at all probable, that the ſulphate of mercury, either pure or coloured with cinnabar, is the calx which Dr. Prieſtley alludes to. He ſays, in his remarks on my obſervations, that it is a red friable ſubſtance, which the rays of the ſun, concentrated by a burning lens of ſixteen inches in diameter, converts into a yellowiſh glaſs, with the loſs of about three tenths of its weight. Now, if it was the ſulphate of mercury, it could be eaſily decompoſed by encreaſing its temperature; and if it was cinnabar, every part of it could be raiſed into vapour: but in neither caſe would it yield a yellowiſh glaſs. Nay, I can ſcarcely believe the ſulphate obtained by heating the turbith is at any time mixed with cinnabar. The red colour which it had in my experiments was not permanent; and, ſince the reading of your letter, I

have, at different times, mixed different proportions of charcoal with turbith, and heated them, but I got no cinnabar. Indeed, the quantity of oxygen in turbith, exclusive of that in its sulphuric acid, is so great, that it must be more than sufficient to consume any inflammable substance, which could, accidentally, and unobserved by any but a bungling chemist, fall into it.

I will not indulge in conjecture, about what may have been the cause of Dr. Priestley's want of success: but this much I will undertake to ensure—if he uses turbith, equally pure with that which I employed, he will, with due pains, reduce the mercury in it without addition.

My turbith was prepared from mercury, previously distilled in a glass retort, and sulphuric acid, first distilled, and afterwards boiled, in glass vessels.

The mercury, with twice its weight of the acid, was put into a glass matrass, and set on a charcoal fire. When the resulting sulphate had become dry, and some of it slightly yellow, the matrass was removed and broken. The sulphate, which was found to be perfectly free from mercurial globules, after being reduced to powder in a glass mortar, was thrown into six times its weight of warm distilled water, and boiled for about ten minutes. On being suffered to cool, a beautiful yellow powder precipitated to the bottom of the vessel. The supernatant liquor being poured off, as much distilled water was added, and the mixture treated as before. This washing, with the distilled water, was thus continued, until some of the fluid, being cooled, and passed through paper, was almost insipid, and afforded only a slight precipitate, on the addition of a solution of muriated barytes. Then, as much as possible of the liquor was poured off, and the remaining water was exhaled by a gentle heat.

I suppose there can be no objection to turbith prepared in this manner; and that it ought to be considered as perfectly pure.

Some address is necessary in the experiments on the decomposition of the turbith and white sulphate. If it be performed in a glass tube, the coals may be set in a common chafing-dish; but they must surround, yet not touch, the part of the tube containing either of the substances. When they do not surround it, the heat is not sufficient; and when they touch it, the glass is apt to melt.

If the fire be too low, it may be enlivened by blowing with the mouth.

It ſometimes happens, particularly with the white ſulphate, and when the glaſs contains much alkali in its compoſition, that the inſide of the tube is corroded; ſo that it may be proper to uſe freſh tubes for the ſucceſſive operations to which it is neceſſary to ſubject the ſulphate.

When the glaſs is much corroded, a white cruſt adheres to its inſide; and, if the heat has been ſufficient, and long enough continued, it will be found to conſiſt chiefly of ſiliceous earth.

If the quantity of the ſulphates be great, it will be neceſſary to uſe an earthen retort, for thoſe of glaſs are ſo thin, that they melt before the decompoſition is finiſhed.

You next charge me with the having aſſerted that the red oxyd of lead contains more oxygen than the black oxyd of iron, and with the having ſuppoſed that it is from that circumſtance the firſt oxygenates the muriatic acid, while the latter does not.

The ſame charge has been made, you know, by Dr. Prieſtley: and, truly, the paragraph quoted by both of you, gives ſome foundation for it; but nothing was farther from my intention than to make ſuch an aſſertion, or to convey ſuch an opinion, and I can readily explain it.

The Doctor had advanced againſt the opinion of the black oxyd of iron containing oxygen, that it did not oxygenate the muriatic acid: whereas, the red oxyd of lead, and other ſubſtances containing oxygen, produced that effect.

This objection I conſidered as frivolous, and did, as the Doctor has ſince ſaid, make very light of it, ſo that I did not pay much attention to the conſtruction of the ſentence deſigned for its anſwer. I intended it ſhould have been underſtood, it did not at all follow, becauſe muriatic acid could ſeparate a certain portion of oxygen from an oxyd of lead, it ſhould likewiſe ſeparate ſome from one of iron; and the more eſpecially, as the oxyd of lead, which will thus give up part of its oxygen, contains the greateſt quantity of it with which the metal can be united: whereas, that in the black oxyd of iron is ſmall in compariſon to the quantity with which the iron can be combined.

To be ſure, this compariſon was not neceſſary, but it was made as affording a corroborating proof of the frivolity of the Doctor's objection, and it ſeems to me to be a ſtrong

one: for the yellow oxyd of lead will not oxygenate the muriatic acid; and from the experiments of Macquart and Vauquelin, it appears, that iron may be joined to enough of oxygen to produce that effect.

The word "comparatively," in the ſentence you quote, was really intended to mark the compariſon between the different degrees of the oxygenation of the iron; and as ſoon as Dr. Prieſtley's pamphlet was ſent to me, I made a note on its margin to that effect.

After having made the charge I have juſt anſwered, you give an account of ſome experiments; and, having let me know my ſuppoſed opinion reſpecting the relative quantities of oxygen in the oxyds of lead and iron is void of foundation, you tell me "The true reaſon that red lead will oxygenate the "muriatic acid, and that a calx of iron will not, is that the "former readily gives its oxygene to the acid, and the latter "does not, owing to a difference in the elective attractions "ſubſiſting between the acid, oxygene, and the two metals."

The obſervation on the ſuppoſed opinion does not apply to me, as I never entertained it.

Your reaſon for the difference in the effects of the red oxyd of lead and black oxyd of iron on the muriatic acid is not ſufficient. It was not neceſſary to give one in my lectures on combuſtion; but ſince you have directed my attention to it, I will now offer what ſeems to me to be "the true reaſon."

Metallic ſubſtances muſt be united to a quantity of oxygen before they can combine with acids, but they may be joined to more than is neceſſary for that purpoſe. The quantity is different for each metal, and, perhaps, for the ſame metal with different acids; nay, for the ſame metal with different proportions of the ſame acid. Red oxyd of lead contains more than the requiſite quantity, while black oxyd of iron, in general, does not. When the red oxyd of lead is mixed with the muriatic acid, the lead, with the due proportion of oxygen, unites with ſome of the acid; while the ſuperfluous oxygen, being diſengaged, joins to and oxygenates another portion of the acid; and it is more than probable its ready ſeparation from the lead is promoted by the diſpoſition which it has to form this combination. But, when the black oxyd of iron is added to the ſame acid, there being nothing ſuperfluous in the mixture, the two ſubſtances unite calmly together.

You may eaſily ſatisfy yourſelf of the truth of what I have ſaid. Pour the muriatic acid on the red oxyd of lead: the oxygenated muriatic acid gas will be immediately diſengaged, and occaſion an effervescence. What remains will, in part, be converted into a muriate of lead; and the whole of it will be thus changed, provided the acid be in ſufficient quantity, and the ſurface of contact between it and the oxyd be frequently renewed by trituration in a mortar, or by boiling.

Make the red oxyd of lead, ſlowly, red-hot, and keep it, for ſome time, at that temperature—a part of its oxygen will be ſeparated, and may be eaſily collected. The reſt, in union with the lead, will form a ſubſtance, which, when cooled, will have a yellowiſh colour. Treat this yellow oxyd with the muriatic acid, in the manner directed for the red, and you will obtain the ſame muriates, but no oxygenated acid. And, laſtly, ſubject the black oxyd of iron to the ſame operations, and you will get only a muriate of iron.

You proceed, and take notice of my having remarked, Dr. Prieſtley was miſtaken in ſaying that finery cinder would not acquire ruſt; and you tell me, that, to determine the queſtion, you expoſed the ſcales which the blackſmiths ſtrike from red-hot iron to the air for twelve months, and that, notwithſtanding they were ſeveral hundred times ſprinkled with water, they remained free from ruſt.

Dr. Prieſtley alſo has accuſed me of "this too confident aſ-"ſertion;" and he has been pleaſed to ſay, it "would aſtoniſh "him if it was not too much of a piece with the reſt of my "performance."

I have often ſince made the experiment you mention, and generally with the ſame ſucceſs, not the ſmalleſt particle of ruſt being perceptible on the ſcales. However, you will not be ſurprized when I mention the circumſtances which led to the remark.

The Doctor had repeatedly declared finery cinder was the ſame ſort of thing with the ſcales of iron, and what was called, or, as he ſaid, dignified, by the name of the black oxyd. Mr. Fourcroy had aſſerted the black oxyd ruſted ſooner than iron. A ſubſtance which I did then, and do now, conſider as a black oxyd of iron, was ruſting before my eyes whilſt I wrote my lecture. And I had many times ſeen ruſt prepared by apothecaries, from a mixture of iron turnings, filings, and ſcales; and I have been often told, the ſcales increaſed the quantity, and haſtened the formation of the ruſt.

But you affirm, "The pure ſcales never will acquire ruſt; for, "when bar-iron is converted into finery cinder, it parts with "the ſmall quantity of coal it contained, and abſorbs oxygen "and water."

It has not been proved the ſcales of iron contain water. Their not ruſting ſeems to be owing to a very different circumſtance. But I will not trouble you with my experiments on this ſubject: they will be reſerved for Dr. Prieſtley.

You then acquaint me, you have repeated the boaſted of experiment with charcoal and iron ſcales, which, I have ſaid, as performed by Dr. Prieſtley, was of no value; and, having informed me you obtained the ſame reſult with him, you intimate, "it has puzzled every one to whom it has been men-"tioned;" but that, for your part, you "do not think it af-"fects the antiphlogiſtic ſyſtem; for the ſcales of iron con-"tain water, and retain it in ſo obſtinate a manner as not to "part with it upon the application of heat; but when coal is "added to the finery cinder, it takes away the water, by hav-"ing a greater affinity to it than to the calx of iron. The "coal decompoſes this water; its oxygen unites to part of the "coal, and forms the carbonic acid; while its hydrogen is ſe-"parated, diſſolves another part of the coal, and forms the car-"bonated hydrogen gas."

There can be no objection to your mode of performing the experiment. From your attending ſo ſtrictly to my obſervations on Dr. Prieſtley's, it would ſeem you did not think them void of foundation.

Who they are to whom you mentioned the experiment I do not know: they may be great lovers of wiſdom, but they have been little accuſtomed to conſider the ſubject in queſtion. Certainly the experiment does not affect the antiphlogiſtic ſyſtem; but, as I cannot admit, till I meet with proof, that the ſcales of iron contain water, I muſt reject your explanation.

I, too, have experimented on this ſubject, and have endeavoured to go a little farther than you. I have tried to aſcertain the nature of the remainder, as well as the quantity and kind of the volatile products. It was chiefly from his not having done ſo, that I ſaid Dr. Prieſtley's experiment was of no value; and as I am ſtill of opinion, unleſs it can be done, no concluſion for the determination of the ſubject in diſpute can be drawn from the experiment, I cannot entertain a more favourable opinion of yours.

My experiments will be repeated; and, if the reſults turn

out as they have hitherto done, it will appear the ſcales of iron, when mixed with perfect charcoal, and heated, loſe no more weight than what is equal to that of the oxygen, which the antiphlogiſtians believe they can prove to be neceſſary for the formation of the product obtained.

If I have not been miſtaken, then, the carbonic acid gas is owing to the union of ſome of the oxygen in the oxyd of iron, with carbon of the charcoal, and the carbonated hydrogen gas to the ſolution of carbon in hydrogen, both furniſhed by the charcoal.

It cannot, as has been already mentioned in my lectures, be objected to this explanation, that the charcoal affords an inflammable gas at a lower temperature when mixed with the ſcales than when uſed by itſelf; for, we know, when carbon and hydrogen are united in certain proportions, as, for inſtance, in the moſt perfect charcoal which has been made, the compound is ſolid at a very high temperature; but, when the proportion of hydrogen is greater, as in carbonated hydrogen gas, it is eaſily made gaſeous. Now, in the experiment under conſideration, the proportion of the hydrogen is increaſed by the union of part of the carbon with ſome of the oxygen in the oxyd of iron.

Neither can it be objected to this explanation, as you have very improperly done to Dr. Prieſtley's, that an oxyd of iron cannot be revived at the temperature to which the ſcales and charcoal are expoſed; for, although the iron does not become perfectly metallic, yet it approaches more nearly to that ſtate than it does before the operation, and thus affords an additional proof of the generality of that law of chemical combination, that a body attracts or retains different proportions of another with unequal force.

Having done with your particulars, you write rather a threatening paragraph: "Should you conſider," ſay you, "the objections of Dr. Prieſtley once more, and advance no-"thing but what is founded upon your own experiments, you "may hear from me again; and I promiſe not to be the firſt "to drop the ſubject."

It has been already intimated, in my letter to Dr. Mitchill, which you have ſeen, that it was my intention to reply to Dr. Prieſtley; and I cannot think I will be deterred from doing ſo, becauſe you have threatened to be my impugner: on the contrary, you are welcome to make whatſoever obſervations you may chooſe on my performance, and I can ſee no material

objection to their being communicated to the public under cover of an addreſs to me.

At the ſame time, be informed, you will write to one who is far from being a punctual correſpondent; even his friends complain their letters are unanſwered; ſo that, it is more than probable, he will take no notice of your criticiſms.

Do not underſtand, from this, I mean to deter you from writing to me. Your letter has afforded not a little entertainment; and, if you can always furniſh me with the like, it will be very acceptable.

Your maxim, that "mere aſſertions only ſerve to fix errors "deeply on the mind, and do not advance the cauſe of truth," will be, henceforth, I hope, ſo deeply impreſſed on your own mind, that your next eſſay will contain fewer than the one which is now anſwered.

In your concluding paragraph, you, doubtleſs, intended to be very ſevere; indeed, from the whole tenor of your epiſtle, it ſeems to have been written at a time when you were rather out of humour.

I am ready to attribute to you the beſt intentions, and to believe you have been induced to treat me in the manner you have done, from the notion of my having been wanting in reſpect to a man, to whoſe exertions Chemiſtry owes much of its advancement, and to whom, perhaps, you are under perſonal obligations.

Without doubt, there are ſeveral paſſages in my lectures, which, had I to write them over again, I would alter, not that my ſentiments, either with reſpect to his opinions or experiments, are in any degree changed, but the expreſſions, in ſome places, are liable to be miſinterpreted, and, in others, do not convey exactly my meaning. If, however, you will be at the trouble to read them over calmly and diſpaſſionately, juſt as they are, you will perceive there is no affront offered to Dr. Prieſtley. But, even if I have been petulant in my remarks, it is ſurely too ſevere to condemn me to a conſtant perſecution. Why, the Doctor himſelf does not think I deſerve it; for, after having treated me roughly, I had almoſt ſaid abuſed me, in his Conſiderations on Phlogiſton, part the ſecond, and been witty at my expenſe, in a letter to Dr. Mitchill, he has invited me to an amicable diſcuſſion of the ſubject, and expreſſed a regret at the publication of his letter.

For my part, I am perfectly diſpoſed to forgive whatever

he has ſaid of me; and ſurely, then, it will not be worth your while to loſe your temper about us: indeed, it would be ſilly in any one, but more particularly in you, to do ſo. A haſty, vindictive, and overbearing diſpoſition, is very unbecoming a philoſopher, and that whether he be a veteran or a novice in ſcience.

Let us, then, be friends; and if you are determined to controvert whatever I may ſay, take care that you do not ſubſtitute hard words in place of ſolid arguments.

I am your humble ſervant,

JOHN MACLEAN.

ARTICLE IX.

Caſe of the DELETERIOUS EFFECTS *of* OPIUM *remedied by the Excitement of Pain.*

By VALENTINE SEAMAN, *M. D.*

HAVING ſo frequently obſerved the great quantity of opium that a perſon, under the operation of acute pain, will take, without having any ſoporific effects induced by it, I have long been of the mind, that pain might be uſefully excited to remove the deadly influence of a large doſe that may have been previouſly taken. This idea I intimated in my Inaugural Diſſertation, publiſhed in 1792.

Yeſterday I had an opportunity of putting my principles to the teſt of experiment, being called to ſee the wife of —— Head, in Water-ſtreet, who had, about two hours before, taken an ounce of laudanum, and then lay in a deadly ſtupor, from which all the efforts of her friends were inſufficient to awaken her. Attempts had been made to get ſome vinegar into her ſtomach, but, I believe, with little effect; nor did I ſucceed much better in endeavouring to give her a doſe of white vitriol. I then procured a ſmall ſwitch, and applied it pretty freely to her arms and ſhoulders, which were defended only by a thin linen covering. I alſo applied ſome ſtrokes to her legs. In the courſe of a very ſhort time, indeed almoſt immediately upon the application of this remedy, ſhe rouſed

up, and begged me to desist. She continued, for a time, much confused, with involuntary turns of laughter. Two scruples of white vitriol were then administered, followed, in about fifteen minutes, by half a dram of ipecacuana; notwithstanding which, and also having her throat repeatedly tickled with an oiled feather, it was near an hour before she could be made to puke: however, finally, she puked, and, by the assistance of frequent draughts of warm water, her stomach was pretty thoroughly evacuated.

By the assistance of her friends she was kept awake, or, at least, slept but little at a time during the night, and this morning appears entirely recovered.

V. SEAMAN.

7th Month 2d, 1799.

ARTICLE X.

To the EDITORS *of the* MEDICAL REPOSITORY.

Philadelphia, July 10, 1799.

Should the following Observations, made on a small Tour through the lower Parts of New-Jersey, appear of sufficient Importance, you will please to insert them in your Repository.—My Rout was from Philadelphia to the Mouth of Great Egg-Harbour River; from there, by the Way of Batstow and Mount-Holly, home.

I am, &c.

THOMAS P. SMITH.

GEOLOGICAL REMARKS.

IMMEDIATELY on leaving the Pennsylvania shore you leave the granite ridge, and find nothing but a loose sandy soil, the greater part of which appears to be silex, interspersed with small rounded silicious stones. I found no stone, of any considerable size, but a brechia, composed of rounded silicious pebbles, imbedded in a very ferruginous *ce-*

ment. The foundations of the houſes in this country, which are all of wood, are formed of this brechia, except on the ſides of creeks, where the veſſels which trade to ports in the granite ridge bring it for ballaſt. In digging wells of a very conſiderable depth, nothing more has been found than the ſilicious ſand, ſmall rounded pebbles, and brechia.*

The whole country is ſo flat that I could not diſtinguiſh the ridge which ſeparates the waters that fall into the ocean from thoſe which fall into the Delaware. The coaſt, on the Atlantic, goes off very regularly into the ocean, at a ſmall angle, and is compoſed of exactly the ſame materials as the whole internal country—a looſe ſand and ſmall rounded pebbles. The pine barrens, which include the whole country, though interſperſed with other trees and underwood, are devoid of all vegetable mould: but this may be owing to the ſand being ſo looſe as to ſuffer it all to be waſhed into the earth.†

Query. From theſe circumſtances may we not conſider this country of very recent formation?

Bog Iron Ores.

I viſited none of theſe iron ores, which abound in this part of Jerſey, of a very excellent quality, but thoſe at Batſtow, which lie on the head waters of Little Egg-Harbour River, being informed by the gentleman who conducts thoſe works that they are all alike. This ore is formed in a bog, on the ſides of Little Egg-Harbour River, which is here a ſmall rapid ſtream. It is chiefly found where the water juſt oozes over the ground. In all probability it is the reſult of vegetable decompoſition, as the whole country round is nothing but ſand. Its formation is very rapid. The director of the works informed me, that he has known one bed, three or four inches thick, to be renewed three times in twenty-five years. As I ſuſpected the iron to be brought from the cedar

* One man, in reply to my queſtion, Whether they ever found any large ſtones in digging beſides the brechia, which I pointed out to him, replied, with ſome exultation, "O, yes, we ſometimes find one, in digging, as large as my head!" From his deſcription theſe *precious ſtones* muſt be rounded pieces of *amorphous quartz.*

† A view of this country would almoſt have ſuperſeded the neceſſity of Van Helmont's experiment of growing a willow in ſand, with diſtilled water. All the woods here grow under theſe circumſtances.

ſwamps above, I teſted the water that was almoſt ſtagnant over the ore, and, to my great ſurprize, found that it afforded no precipitate with the gallic acid, nor with pruſſiate of potaſh. When I added ſome acetic acid to the latter, a little blue precipitate was diſengaged, but not more than might be accounted for by the iron contained in the pruſſiate of potaſh. I had then the curioſity to teſt it with nitrate of quickſilver, acetate of lead, ſulphate of iron, and cuprum ammoniacum, and it afforded no precipitate; ſo that it appears as free from mixture as diſtilled water. On the ſurface, however, there was the uſual appearance of chalybeate water, but not to a very great extent.* There might, then, be a minute quantity of iron in the water, but too little to be detected by my teſts. On my return to Philadelphia I examined my teſts, and found them to be good. How, then, is this iron ore formed? Is the iron, on the vegetables being decompoſed, ſo far oxyded as to be inſoluble, and, therefore, only ſuſpended by the water, and depoſited as ſoon as it remains at reſt?

Waters.

I teſted the well-waters in the barrens, and found none of them contained any muriatic acid. This is an extraordinary circumſtance, as I never teſted any waters in the granite ridge without finding it, though more diſtant from the ocean. This is ſo general, that as ſoon as the country in Jerſey, about nine miles to the eaſtward of Mount-Holly, began to wear a little the appearance of decompoſed granite, the water afforded a copious precipitate with nitrate of mercury.† Can there *poſſibly* exiſt any connection between theſe circumſtances?

I teſted a well at the mouth of Great Egg-Harbour River, though within a few hundred yards of the ſalt water; it gave ſcarcely a viſible precipitate. Does not this fact entirely diſprove a theory which has lately been attempted to be eſtabliſhed, of the capillary origin of ſprings and rivers? The water of this well was about on a level with the ocean. If, then, its waters paſs ſo far inland, and ſo high as to burſt out in ſprings on mountains, as is pretended, why was not this well impregnated with muriate of ſoda, as it is in a looſe ſoil,

* Wherever the water oozes through places where vegetables are decompoſing, there is this appearance: but ſuch waters ſeldom contain iron enough to be precipitated by the moſt delicate teſt, as I have often experienced.

† The nitrate of ſilver is, perhaps, a better teſt; but this is certainly accurate enough for all practical purpoſes.

with every advantage for that purpoſe? It cannot be pretended that the water is deprived of the ſalt by filtration, as it is well known that no operation of this kind will ſeparate ſalt when diſſolved.

ARTICLE XI.

On the Vapour which riſes from the Surface of the River St. Lawrence during the ſevere cold of Winter. In a Letter from Mr. F. BLANCHET, *of Quebec, to Mr.* MITCHILL, *dated Eſſex County (N. J.), July* 9, 1799.

SIR,

HAVING had opportunities of examining the effects of cold upon the human body, I have been induced, by a ſort of neceſſity, to inqure into its general effect in the phenomenon of *the freezing of water.*

It appears to me, that the philoſophers who have treated this ſubject, have not expreſſed themſelves in a manner ſufficiently exact, and do not ſeem to have comprehended the whole of the proceſs. The object which I have in view, and which does not appear to have been handled right, is the vapour which riſes from the ſurface of a river, &c. during the ſevere colds of the winter. This vapour does not proceed entirely from the caloric which is diſengaged from the water during its congelation; but, as I judge, is occaſioned, principally, by the ſuperabundance of caloric which is accumulated in that fluid; the reaſon whereof I take to be this: during the congelation of water, in general, the caloric, which preſerves it either in a gaſeous or liquid ſtate, is ſet looſe, *alone*, or in a *ſeparate* form, whenever the particles or globules of water are condenſed into ice. But the vapour which riſes from the ſurface of a river or a rapid that is in a ſtate of congelation, is occaſioned by the caloric which is accumulated under the ice.

For, I view it to be a well eſtabliſhed fact, that the internal heat of the earth is the cauſe of the fluidity of ocean-water, as well as of the water of great and ſmall rivers, &c. and

there is no doubt that, without this interior heat of the globe, which is diffuſed inceſſantly toward its ſurface, the water of the River St. Lawrence, and other great and deep waters, would be changed, during the exceſſive colds of winter, to a clear and ſolid maſs of ice. But, fortunately for living beings, the ſubterranean heat prevents the occurrence of this accident.

Now, ſince this is not the caſe, and ſince there is diſengaged from the central parts of the earth a certain quantity of caloric, the floating ice with which the river is covered being a bad conductor, and an impediment to its uniform eſcape, its accumulation below renders the water warm, and, conſequently, produces the exhalation, or moiſt-like meteor, which we obſerve between the maſſes of ice, or at the air-holes.

Some perſons have remarked, that water, at the freezing point, was colder than ice. If this is the fact, how can we conceive that water, which, according to this idea, contains a ſmaller quantity of heat than ice, can furniſh, on becoming congealed, to the ſurrounding water, a degree of heat ſufficient to elevate and turn it to vapour?

Thus, Sir, I have every reaſon to believe, that the vapour, or exhalation, obſervable above the ſurface of a river, while it remains frozen (except in certain ſpots, and thoſe the ſpots whence the vapour riſes), is owing, in a great meaſure, to the ſubterranean heat which, in ſuch circumſtances, is accumulated in the water beneath the bridge or cover of ice.

This miſtake, on the part of philoſophers, proceeds, as I apprehend, from their having made no diſtinction between the congelation which takes place upon a ſmall ſcale, or in a veſſel, and that which happens upon a great ſcale, as in a large river, &c. This, therefore, is a matter particularly to be attended to; ſince the central heat, which is continually extricated, ought to make a pointed difference in the circumſtances of the two caſes.

I am, with the moſt profound reſpect,
Sir, your very humble and obedient ſervant,

F. BLANCHET.

ARTICLE XII.

Facts and Remarks on the Antiseptic Powers of Lixivial and Oleaginous Substances: *Communicated by Mr.* F. Blanchet, *to Dr.* Mitchill.

Account of the Guanchios, *or ancient Inhabitants of the Iſland of Teneriffe, given by a judicious and inquiſitive Man, who lived twenty Years in it, as a Phyſician and Merchant.* (Extracted from the Hiſtory of the Royal Society of London).

"SEPTEMBER the third,* about twelve years ſince, he took his journey from Guimar (a town inhabited, for the moſt part, by ſuch as derive themſelves from the old *Guanchios)*, in the company of ſome of them, to view their caves, and the bodies buried in them. This was a favour they ſeldom or never permit to any (having in great veneration the bodies of their anceſtors, and, likewiſe, being extremely againſt any diſturbance of the dead); but he had done ſeveral *eleemoſynary* cures amongſt them (for they are generally very poor; yet the pooreſt thinks himſelf too good to marry with the beſt Spaniard), which endeared him to them exceedingly; otherwiſe it is death for any ſtranger to viſit theſe caves or bodies.

"Theſe bodies are ſewed up in goat ſkins, with thongs of the ſame, with very great care, particularly in the incomparable exactneſs and evenneſs of the ſeams; and the ſkins are made very tight, and cloſe to the body. Moſt of theſe bodies are entire: the eyes cloſed, hair on the head, ears, noſe, teeth, lips, beard, likewiſe the *pudenda* of both ſexes, all perfect, only diſcoloured, and a little ſhrivelled. He ſaw about three or four hundred in ſeveral caves. Some of them are ſtanding, others lie on beds of wood, ſo hardened by an art they had (which the *Spaniards* call *curar*, to cure a piece of wood), that no iron can pierce or hurt it. He ſays, that one day, be-

* The year is accidentally defaced.

ing a hunting, a ferret (which is much in uſe there), having a bell about his neck, ran after a coney into a hole, where they loſt the ſound of the bell. The owner, being afraid he ſhould loſe his ferret, peeping about the rock and ſhrubs, found the mouth of a cave, and, entering in, was ſo affrighted that he cried out. It was at the ſight of one of theſe bodies, very tall and large, lying with his head on a great ſtone, his feet ſupported with a little wall of ſtone, and the body reſting on a bed of wood (as before was mentioned). The fellow, being now a little out of his fright, entered it, and cut off a great piece of the ſkin that lay on the breaſt of this body, which, the Doctor ſays, was more flexible and pliant than ever he felt any kid's leather glove, and yet ſo far from being rotten, that the man uſed it for his flail many years after.

"Theſe bodies are very light, as if made up of ſtraw; and, in ſome broken limbs, he obſerved the nerves and tendons, and alſo ſome ſtrings of the veins and arteries, very diſtinctly.

"His great care was to inquire of theſe people what they had amongſt them of tradition, concerning the embalming and preſervation of theſe bodies. From ſome of the eldeſt of them (above a hundred and ten years of age) he received this account—that they had, of old, one particular tribe of men that had this art amongſt themſelves only, and kept it as a thing ſacred, and not to be communicated to the vulgar. Theſe mixed not with the reſt of the inhabitants, nor married out of their own tribe, and were alſo their prieſts and miniſters of religion: that, upon the conqueſt of the *Spaniards*, they were moſt of them deſtroyed, and the art loſt with them; only they held ſome traditions yet of a few ingredients that were made uſe of in this buſineſs. They took butter of goat's milk (ſome ſaid hog's greaſe was mingled with it), which they kept in ſkins for this purpoſe: in this they boiled certain herbs: firſt a ſort of wild lavender, which grows there, in great quantities, on the rocks. Secondly, an herb called lata, of a very gummy and glutinous conſiſtence, which now grows there on the tops of the mountains only. Thirdly, a kind of cyclamen, or ſow-bread. Fourthly, wild ſage, growing plentifully in this iſland. Theſe, with others, bruiſed and boiled in the butter, rendered it a perfect balſam. This prepared, they firſt embowelled the corpſe, and, in the poorer ſort, to ſave charges, they took out the brain behind;

theſe poor were alſo ſewed up in ſkins with the hair on; whereas the richer ſort were, as was ſaid before, put up in ſkins ſo finely and exactly dreſſed, that they remain, moſt rarely, pliant and yielding to this day. After the body was thus prepared, they had in readineſs a *lixivium*, made of the bark of pine trees, with which they waſh the body, drying it in the ſun in ſummer, and in ſtoves in winter; repeating this very often. Afterward they began their unction with the balſam, both without and within, drying it again as before. This they continued till the balſam had penetrated into the whole habit, and the muſcles, in all parts, appeared through the contracted ſkin, and the body became exceedingly light; then they ſewed them up in the goat-ſkins, as was mentioned already. He was told by theſe ancient people, that they have above twenty caves of their kings and great perſons, with their whole families, yet unknown to any but themſelves, and which they will never diſcover. Laſtly, he ſays, that bodies are found in the caves of the *Grand Canaria* in ſacks, and quite conſumed, not as thoſe in *Teneriffe*."

Remarks of Mr. B. on the above Account.

It ſeems to me that nature has explained herſelf in a more intelligible, and leſs equivocal manner to theſe ſavages than to our civilized people; or, rather, our prejudices of every kind render us deaf to her inſtructive voice: for, theſe children of Nature have accompliſhed, by inſtinct, what many centuries have not been able to teach our haughty philoſophy. It is only by a long ſeries of labours and experiments, that we have finally got back to this primitive ſimplicity.

From this barbarous people I turn my view to the inhabitants of ancient Egypt, who have been a ſubject of admiration in all ages. Theſe, whom every thing around them concurred to render both knowing and ſuperſtitious, have left us unchanging monuments of this ſtriking contraſt. Expoſed, by turns, to a crowd of bleſſings and of evils, this people was neceſſarily the ſubject of their influence. And, indeed, a ſoil which, one while, furniſhed them with grain in abundance, at another time refuſed its ſupplies, and was unproductive, and, then again, was ſurcharged with ſeptic poiſon, might be expected to diffuſe gaiety or ſcatter terror into their

hearts. To theſe principal cauſes we may add a number of ſecondary ones; ſuch as the rapid and numerous production of inſects, reptiles, and other devouring creatures, which infeſted, from time to time, the land of their reſidence. Such a contrariety of productions and conditions might be expected to ſharpen their faculties, rouſe their imaginations, and make them, at once, a knowing and ſuperſtitious race.

Be theſe things as they may, I ſhall, for the preſent, content myſelf with offering a few reflections on their manner of embalming their dead. The mummies are contained in ſubterranean vaults, and are, at this day, the admiration and aſtoniſhment of travellers. It has been laboured, with all aſſiduity, to diſcover this art, which has been loſt in the ages of ignorance and barbariſm. If, however, attention be paid to the characters and manners of this people, and, more particularly, to the climate in which they dwelt, it will be ſeen, that the *art of embalming their bodies* might be expected to have been begun, and to have grown to perfection, among them: for, mankind, in general, being more or leſs deſirous of perpetuating the memory of their fathers, this ſame deſire of immortality ought to have been powerfully felt by a people of warm and irritable minds, who would, conſequently, engage with ardour in ſeeking out the means.

Beſides, the exceſſive heat of their climate, and the peſtilential atmoſphere which they breathed, and of which they were ſo frequently the victims, would quicken, exceedingly, the progreſs of putrefaction in a body juſt dead. From this rapidity of decay aroſe the neceſſity of daubing theſe bodies with odoriferous ointments, to counteract the fetid exhalations which proceeded from them. This firſt ſtep led, with haſty ſtrides, to the diſcovery of the art they were ſeeking, ſince *greaſy ſubſtances reſiſt all manner of putrefaction*, and are properly ranked among the agents which retard or counteract that proceſs.

Therefore, by the rule of analogy, it may be inferred, with the higheſt probability, that the deſire of guarding the living againſt an infected and impure air, led the Egyptians, accidentally, to the mode of embalming the bodies of their dead, or made them early perceive the efficacy of the means of doing it; while they were endeavouring to repreſs the exhalations from putrefying carcaſes. From this rude beginning the art would be improved and refined, in proportion to the progreſs of wealth and luxury.

The proceſs by which the old natives of Teneriffe embalmed or preſerved their dead, is certainly a proof of the generation of certain acids in a corrupting corpſe. The *fat* which generally is abſorbed, or diſappears before death (provided the death is not violent or ſudden), is a further proof that the prevailing acid is not the carbonic. Then, if the *lean* and *muſcular* parts are chiefly thoſe which are left, we may conclude that the oxygene, aſſiſted by caloric, will connect itſelf with the ſepton (azote) of theſe ſubſtances, and engender or conſtitute the ACID OF PUTREFACTION.*

The proceedings of this ſavage people to prevent the total diſorganization of their dead, are founded on the nature and reality of things; that is to ſay, by penetrating the carcaſes with *lixivium* or *ley*, they neutralize thereby every acid that can be formed; and thus oppoſe the work of corruption. Such, O poliſhed nations! are the ſagacity and knowledge of the people whom we deſpiſe. It ſeems as if nature had been pleaſed to inſtruct theſe humble beings in the ſecrets of her works, while ſhe has treated *our* pride with diſdain.

F. BLANCHET.

Eſſex County (New-Jerſey), July 6, 1799.

* See Mitchill's letters on the doctrine of ſepton, of which there is a catalogue in Med. Repoſ. vol. ii. p. 97—98; and, for the pieces written ſince that enumeration was made, ſee the ſame volume, p. 292—vol. iii. p. 14—New-York Monthly Magazine for July, 1799, p. 264—the London Monthly Magazine for March and April, 1799—Hardie's Account of the Malignant Fever at New-York, in the year 1798—and an abſtract of much of the doctrine, in the appendix to 2 Trotter's Medicina Nautica, printed in London, 1799—ſome account of its application to explain the phenomena of fever, &c. in Tilloch's Philoſophical Magazine for June and July, 1799.

ARTICLE XIII.

Speculations concerning the perſpirable Fluids of Human Bodies, with the View of aſcertaining how they are ſometimes converted to ſeptic or peſtilential Matter. In a Letter from Dr. MITCHILL *to* ANDREW DUNCAN, *M. D. &c. Profeſſor of the Inſtitutes of Medicine in the Univerſity of Edinburgh, dated Auguſt* 11, 1798.

SIR,

IN reply to your laſt letter from Edinburgh, I have to remark, that, of the fluids afforded by the human body, few have been more talked of, though, perhaps, none to leſs advantage, than thoſe exhalations or effuſions from its ſurface, denominated *perſpiration* or *ſweat*. The reaſon alleged wherefore ſo little has been experimentally done upon theſe fluids or humours, is, that they cannot be obtained in ſufficient quantity; their volatility being ſuch as to prevent the collection of either of them, to ſuch an amount, that much certain information can be obtained about their peculiar natures and qualities.

This is, indeed, in ſome degree, the caſe; and, without doubt, the difficulty of procuring, conveniently and frequently, parcels of the matter ſecreted from the ſkin, has retarded the progreſs of inquiry on this point. While, therefore, the fluids ſecreted in the liver, pancreas, kidneys, ſtomach, mouth, and almoſt every other part of the human frame, have been examined with great care and exactneſs, experimenters are yet very much behind-hand in their knowledge of the cuticular diſcharge.

It is not my intention to ſtrike the balance between the proportions of fluids ſecreted by the kidneys and the ſkin, on the one part, nor to adjuſt the difference between the exhalation by arteries or glands, and the inhalation by lymphatics or abſorbents, on the other. My object is, to examine, by ſuch means as, it appears to me, we are poſſeſſed of, what ſubſtances they are which compoſe the cuticular ſecretion in the time of health, what alterations it undergoes by accumulation and confinement in certain caſes, and how peſtilential fluids and fomites may be produced thereby.

It will not, therefore, be neceſſary to give an anatomical

deſcription of the ſkin. All that will be offered will be capable of being comprehended without going into details upon that ſubject. Almoſt all that you need recollect is, that the *true ſkin* is furniſhed with arteries, veins, glands, excretory ducts, and lymphatics, and that it is covered over by a porous, ſemi-tranſparent ſort of ſheath, called EPIDERMIS, or CUTICLE, which is *inſenſible*, *bibulous*, and *exceedingly apt to grow naſty*; and this to a conſiderable degree without the conſciouſneſs of the wearer.

A quantity of oil, ſecreted into the cells of the adipoſe membrane, underlays the true ſkin in moſt parts of the body; and the veſſels and glands concerned in this function combine alſo a portion of the phlogiſton (hydrogene) and carbone of the blood, into a ſebaceous or greaſy compoſition, to anoint and ſoften the cuticle. A portion of this fatty matter, in the time of health, is daubed over the whole ſurface, though in greater quantity in ſome parts, and at ſome times, than at others. (Liquor oleoſus—inflammabilis—cutem perungit. *Haller.* 5 Element. Phyſiolog. § 20). The palms of the hands, the inſides of the fingers, and the ſoles of the feet, are remarked for having the leaſt of it.

This oily fluid, with which the external ſurface of the body is beſmeared, was found, in the early ſtages of ſociety, while yet dreſs was ſimple, and few or no clothes were worn, to be too copious in ſome conſtitutions, and to collect in greater quantity than the purpoſes of comfort required. When this happened, from its adheſive nature, particles of duſt, and other things floating in the air, would readily ſtick to it, and occaſion ſome degree of unpleaſant ſenſation. To remove this unpleaſantneſs, and the cauſe of it, inſtinct or accident led to the practice of *bathing*, or of purification with *water*; which being not capable of removing completely the foul and greaſy collection, was afterwards quickened in its activity by *alkalies* and *ſoaps*, ſubſtances which experience proved to be very efficacious in ridding the ſkin of its incumbrance. It ſometimes happened, too, that the oily liniment of the ſkin was too ſparingly effuſed, or too quickly removed, and did not impart to the cuticle (which, it will be remembered, has neither nerves nor ſenſibility) that pliancy and ſuppleneſs which is eſſential to pleaſant and perfect feeling. The epidermis was then prone to become horny, to crack, and to induce diſagreeable or painful ſenſation. To relieve this inconvenience, the cuſtom of applying *greaſe* or *oil* over the

ſurface of the body ſeems to have been adopted by mankind, likewiſe at a very early period; and, in this way, the deficiency of the natural ſecretion was ſupplied by art.

The uſe of water, and of alkaline lotions, ſometimes rendered more active by being warmed, and the employment of oil and ſoft ointments, now and then aided by *manual friction*, ſeem to have obtained very extenſively, from the mere comfortable effects they wrought, without any reaſoning or theory whatever. Sometimes a perſon employed the *watery* application only, ſometimes the *oily*, and then again he made uſe of *both*, in rapid ſucceſſion.

But this adipoſe ſecretion is by no means a *pure oil*. According to circumſtances, it is occaſionally blended with *phoſphoric*, *ſulphuric*, *ſeptic*, and a ſurpluſage of *carbonic* matter.

And it is further altered, as far as its nature will permit, by the conſtant tranſmiſſion of that AQUEOUS FLUID, the INSENSIBLE PERSPIRATION, through the cuticle, and by the drops of SWEAT into which it is ſometimes condenſed; both formed by a coalition of a portion of the phlogiſton (hydrogene) of the blood, with a parcel of its oxygene, and this liquid ſerving as a menſtruum for certain other ſubſtances. The exceedingly great quantity of perſpired matter inceſſantly paſſing off from every exhalant pore of the ſkin, leaves behind, as it evaporates, ſome of its more fixed, ſaline, and feculent parts, along with, or upon, the greaſy covering of the cuticle. A portion of carbone, phoſphorus, and ſepton, with, ſometimes, an overplus of oxygene, ſeem to accompany this effuſion of the ſkin, and, in ſome quantity, to remain behind, after the water has evaporated.

It was remarked before, that the cuticle was inſenſible, bibulous, and, of courſe, exceedingly apt to grow naſty. How can it be otherwiſe? The cuticle has neither nerves nor blood-veſſels, and there is little or no reaſon to believe that it poſſeſſes organization. It is, therefore, in ſtrictneſs, leſs a part of the living body, than a kind of tight-ſhirt, or cloſe-ſetting tunic, drawn over the whole ſurface of the body This ſhirt or tunic of cuticle may be conſidered as a foreign wrapper, or piece of natural clothing; and, like every other foreign thing which enwraps the body, is liable to become charged with ſuch ſubſtances as are excreted from the TRUE SKIN within it. The foulneſs of this NATURAL SHIRT is a frequent occurrence. Almoſt every body lets it get naſty.

When the naſtineſs is very conſiderable, the poiſonous or ſtimulant matter entangled there, irritates or inflames the organ of feeling, with which it lies in contact, and produces various itchings, pimples, eruptions, blotches, tetters, ſores, &c. being a PRINCIPAL CAUSE of the diſtempers of the ſkin. To a correct mind, *a dirty cuticle will appear to be a dirty ſhirt.* If the former could be ſtripped off, and cleanſed in the waſh-tub, like the latter, there might poſſibly be a convenience in it. This is, however, of ſmall moment, ſince we know the cuticle can be well cleanſed without being taken off.

The modern uſe of white linen and cotton, as articles of raiment, enables us to judge, with tolerable accuracy, what material it is, which ſhirts, made of thoſe kinds of cloth, and worn next the cuticle, receive from the PERSPIRATION and SWEAT. What the garments imbibe muſt have paſſed firſt through the exhalant arteries or excretory ducts, then undergone a further change while remaining in and about the CUTICLE or FIRST SHIRT, and afterwards have been tranſmitted, by rubbing or wiping, to the linen fibres or cotton filaments OF THE SECOND. The animal matter which befouls the OUTER SHIRT is a good indication of that which adheres TO THE INNER. For, as clean linen and cotton become ſoiled very ſoon by lying in contact with any part of the human body, what they receive muſt be principally derived from the cuticle which they touch and abſterge.

The uncleanneſs of SHIRTS, DRAWERS, and STOCKINGS, may, therefore, be deemed to be matter wiped from the CUTICLE, and derived to the cuticle from the veſſels and ducts of the ſubjacent TRUE SKIN. An examination, then, of the facts relative to clothing grown foul by long wearing next the cuticle, may be conſidered as virtually an examination of the cuticle itſelf, and of the excreted matters which ſtick to it.

I. One general property of all theſe matters, and of clothes tainted by them, is, that alkaline ſalts and ſoaps will ſeize, neutralize, and extract them; the garments being thereby rendered wholeſome and clean. An unqueſtionable effect of ſuch applications is to remove the *greaſy* or *unctuous* matter communicated to them from the cuticle. But this is not all—The *watery* as well as the *oily* part of the perſpirable matter contains the BASES OF ACIDS. A portion of oxygene combining with this fat material, imparts to it more or leſs of

rancidity. Another portion, uniting to carbone, forms carbonic acid, and this, volatilized by heat, is converted to carbonic acid gas. Another portion of the acidifying principle, uniting to the phoſphorus, turns it to phoſphoric acid: while the ſepton (azote), if it happens to combine with caloric alone, flies off in the form of azotic air; or, if it makes a junction with oxygene, conſtitutes, with it, SEPTIC ACID. Oils, being capable of uniting with the ſtronger acids, eſpecially with the ſeptic, and probably, alſo, with the phoſphoric and carbonic, there can be little doubt that theſe acids, or ſome of them, or ſome part of ſome of them, join with the adipoſe matter into a ſort of ACID SOAP, on the cuticle and ſhirt. This acidifying proceſs, whereby carbone, phoſphorus, and ſepton, unite to oxygene, takes place, NOT BEFORE SECRETION, but AFTER the perſpired matter is depoſited on the cuticle, or lodged in the ſhirt. The formation of acids, in this caſe, is not the immediate effect of vital movement at all, but reſults from chemical attraction going on among the particles of the fluids, AFTER EXCRETION, as in other inanimate matter; neither the cuticle, nor the fluids which beſmear and bedew it, having any living energy to controul or modify the laws of chemical action. Hence proceeds that SOUR SMELL from clothes in which ſailors and labouring men have ſweated profuſely, which, though obvious to the ſenſes, and familiar to the wearers and to waſher-women, remains unknown to hardly any body but philoſophers.

Thus a ſolution of an alkaline ſalt, or of a ſoap, detaches all *acids* from the cuticle and from clothes, as likewiſe from all oily or other connections they may have formed. And the ſame lixivial and ſaponaceous mixtures remove all *greaſy* ſubſtances, by virtue of the ſtronger attraction they exert toward theſe, than theſe poſſeſs for the cuticle, or the garment worn next to it. On the cleanſing of clothes there is one fact worthy of being mentioned. Sailors, on Weſt-India voyages, when deſtitute of ſoap, frequently waſh their clothes in water, WITH THE AID OF MOLASSES, as a ſubſtitute for ſoap. They find this practice anſwer pretty well. Sugar is known to decompound nitrous acid very readily. Is not the purification of mariners' clothes, in this manner, a circumſtance of weight, to evince the decompoſition of the ſeptic acid they contain, by the ſaccharine ingredient of the molaſſes?

Such is the detail of the principal conſtituent parts of that

naſtineſs which accumulates on the ſkins and in the garments of human beings; and ſuch the theory of the operation of alkalies, &c. in making them clean. From a compariſon of the facts relative to *perſpiration* with thoſe which reſpect *urine*, it will readily appear, that the two fluids very much reſemble each other, as might naturally be ſuppoſed from the great connection there has been long known to exiſt between the two diſcharges. What is, therefore, true of the one, is, to moſt purpoſes, applicable to the other. In particular, the ſweat as well as the urine contains *ſepton*, which often combines with oxygene, and forms that noxious compound, *ſeptic acid*.

Yet it muſt be remembered, that as extractive matter and acids are capable of ſolution in mere water, and require not the aid of alkalies to detach them, that waſhing the cuticle in cool, or, more readily, in warm water, removes every thing but the greaſe, and even looſens or liquefies a part of that. Water cleanſes the cuticle or a ſhirt by exerting a greater attraction for the foul material ſticking to them, than the ſkin or a garment does. For this purpoſe the water muſt be clean, or, at leaſt, leſs tainted than the ſubject intended to be purified. Upon the ſame principle that *water* or *alkaline ley* cleanſes the cuticle, a *clean ſhirt* will do the ſame; that is, by attracting or abſorbing from it ſomething foul or foreign. *Clean ſhirts*, *drawers*, and *ſtockings*, are, therefore, ſubſtitutes for *clean water*: and he who changes his linen very frequently, deterges the ſurface of the body *almoſt* as much as by bathing; and, perhaps, for the purpoſes of health, *quite* as much. This appears to be more certainly the caſe, becauſe, after waſhing in ſoap-ſuds, a portion of alkali adheres to the cloth, unleſs it be well rinſed, and is inſtantly ready to exert its neutralizing effect. A dry ſhirt, thus waſhed, may be conceived as beſprinkled with innumerable minute cryſtals of potaſh and ſoda.

Pathologiſts have obſerved that *acid ſweats* have ſometimes occurred. In theſe caſes an aceſcent diſpoſition, or acid acrimony preſent in the blood, at the critical period of fevers, and at other times, may tincture the fluids ſecreted in the veſſels of the ſkin with ſome of their peculiar qualities. This has been alleged to have taken place to ſo high a degree as to turn *blue* litmus-paper to a *red*. It is not material to my argument whether this happens frequently or never. It is enough for my purpoſe that the liquids excreted on the cuticle have a

tendency to become acid, *after* being depoſited there. If *acid ſecretions* ever happen, they exhibit a ſtronger caſe, and illuſtrate the doctrine with additional force.

II. Another general property of theſe vitiated or corrupted animal excretions is to rot the clothing to which they adhere, and cauſe it to wear out the faſter. A ſhirt, indeed, worn until its threads are fully impregnated with foulneſs, requires ſo much ſoaking and friction, while in the waſh, that there can be no wonder if, in the operations of being made clean, it is almoſt wrung or rubbed to pieces. But, independent of all this, it is well known that linen, and clothing of all kinds, become very remarkably weaker by lying and remaining long in their dirt, without being ever handled by the laundreſs. There may be ſuch a collection and concentration of animal matter, as not only to rot the cloth, but to convert it to an infectious ſomes, and make it diffuſe peſtilential vapours around. Garments, too long worn, without being cleanſed from time to time, often grow *rotten* and *infectious* as they grow *naſty*. Alkalies remove the naſtineſs, and, if applied diſcreetly, in ſeaſon, prevent the rottenneſs, and check the infection. Every day's experience demonſtrates their efficacy in theſe proceſſes. The following fact may ſerve as an exemplification of a very common occurrence: A gentleman, in the time of war, was taken captive, and compelled, by the enemy, to march on foot a great diſtance, at a violent rate, during very hot weather. He ſweated moſt profuſely. At the end of the march he was confined in priſon, and treated with great rigour. Being deprived of changes of raiment, and of the means of keeping himſelf clean, his ſhirt, in a ſhort time after his confinement, became rotten, and he fell ſick of a fever. In this inſtance, no doubt, both the cuticle and ſhirt became impregnated with *ſeptic poiſon*, manufactured from the *ſweat*, from which both the *conſtitution* and the *clothing* were the ſufferers. In this way the American and Britiſh ſailors, who viſit the Weſt-Indies, *catch yellow fevers*, as they are called, without once going on ſhore, or having any communication with infected perſons. Numberleſs facts prove that, even in the harbours, theſe fatal diſtempers are not *introduced from on ſhore, but bred and ſupported on board the veſſels themſelves*, in which the people fall ſick, whence they are carried on ſhore to be cured.

III. A third general effect of theſe ſeptic productions, as was obſerved in the preceding paragraph, is *to injure the con-*

ſtitution. This they do in two ways: 1. By a direct ſtimulant operation upon the part of the *true ſkin* to which they are applied, cauſing different forms of tinea, herpes, pſora, elephantiaſis, petechial and miliary eruptions, &c. &c. and, 2. By a direct ſtimulant operation upon the heart and ſanguiferous veſſels, after they are conveyed thither through the abſorbents ariſing from the cuticular ſurface, cauſing various grades of febrile diſturbance, of the intermittent, remittent, and continued forms, and inducing diſtempered motions in the lymphatic ſyſtem, as they paſs through its branches. All examiners of this ſubject ſhould, however, recollect, that ſeptic fluids, though they exiſt on the cuticle and in the blood-veſſels, do not always ſtir up diſeaſes; for the conſtitution may be, and frequently is, in ſuch a ſtate as to reſiſt their tendency to produce morbid action; the reaſon of which ſeems to be, that the ſtimulus no longer irritates a conſtitution which is ſeaſoned or habituated to it.

IV. A fourth general property of theſe fluids, engendered in corruption, is to be volatilized by the heat of ſummer and autumn in the United States. The noxious quality of the vapours proceeding from putrefying collections of common animal matter is too well known to require mentioning in this place. When that other animal matter which conſtitutes perſpiration and ſweat, and accumulates in the cuticle and clothing to large amount, has undergone the changes to which it is prone, it is much diſpoſed to aſſume the aërial form. Some portions of theſe exhaling vapours are often pungent, active, and of a deleterious quality. They are produced, generally ſpeaking, not in the circulating blood, nor during the proceſs of ſecretion, but *after their* depoſition upon the cuticle and clothes, and aided by HEAT and MOISTURE, through a proceſs ſimilar to that which converts urine, and ſeveral other excrementitious ſubſtances, into offenſive and noxious airs.

Clothing, or merchandize of any kind, wherein noxious airs or fluids of the ſeptic kind are generated or accumulated, is called a FOMES. In this way bills of paper-money, paſſing frequently from man to man, and becoming tainted with every thing that human hands can impart to them, have, in the city of New-York, degenerated to a *fomes*. So the ſhoes and ſtockings of that unclean perſon who ſuffers ſeptic acid ſo to accumulate about the toes and feet as to eat away the cuticle to the quick, may become a *fomes*. In like man-

ner a ſeaman's cheſt of dirty clothes, tainted with all kinds of animal exudations, may, during a voyage from Cape-François to New-York, turn to a *fomes*, though not a particle of infection was borrowed from the atmoſphere of St. Domingo, or from any perſon living or dying in it. By a proceſs in no wiſe different, do feather beds, and beds of all kinds, that have been long laid upon, and thereby become thoroughly impregnated with perſpirable and other matter, acquire their unwholeſome qualities, and turn to a *fomes*. Juſt thus are clothes charged with perſpirable and other excrementitious matter, diſcharged from the bodies of priſoners in jail, and of other perſons living in foul and confined places, converted to venom and peſtilence, or to an infectious or contagious *fomes*. And it is not impoſſible that a bale of cotton, or any ſimilar material, may, by impregnation with animal matter, become a repoſitory of miſchief, and *a fomes*.

In the preceding paragraph I have introduced the word "fomes" as often as I conveniently could; and have done ſo that I might ſhew the impropriety of the term, and offer my objections to it. The *literal* meaning of *fomes*, in Latin, refers to that quality, in bodies, which makes them catch and retain fire very readily; ſuch as punk, tinder, lint-ſtock, and touch-wood (rapuitque in *fomite* flammam—Virg. Æneid i. v. 180; in the note to which, in the Dauphin's edition, may be ſeen a blunder of the critics.) ACHATES uſed a *fomes* when he ſtruck fire with flint, &c. *Metaphorically*, it denotes an incentive or motive to any action. While the belief prevailed, that infection was carried from place to place, like a fire-brand, and paſſed from perſon to perſon, like a ſpark, the word "fomes" was borrowed to expreſs, by a ſtrong and illuſtrative figure, the analogy between the ſuppoſed effects of fire and thoſe of peſtilence. As each of the ſubſtances juſt named was a fomes of fire, ſo a cheſt of clothes, a blanket, a bed, or a bale of merchandize, was a fomes of peſtilence. This mode of expreſſion was thought to be highly philoſophical and correct; inſomuch, that when any one affirmed that an atom of contagious matter, received into a blanket, multiplied itſelf as a ſpark of fire enlarges in a tinder-box, he was thought to expreſs himſelf ſenſibly.

But it will appear, to any one who comprehends the preceding obſervations, that the ſimile, if it be intended for a ſimile, is imperfect, or the metaphor, if it is meant for a metaphor, is deceitful: for it has been ſhewn, that the thing

called a *fomes* produces peſtilential matter without having a particle of infection (like a ſpark of fire, or even a bit of leaven) introduced into it from without; and it follows, of courſe, that all figurative expreſſions, calculated to uphold the idea *of foreign introduction* of common peſtilential matter, and its *derivation ab extrà*, are highly conducive to the continuance and propagation of error. It is high time this form of ſpeech was diſcontinued. This figurative expreſſion itſelf, and the unhappy aſſociation of ideas which ſprings from it, are the cauſe of a large proportion of the wrong-headedneſs now prevalent, concerning the diſtempers called infectious.

Was not the malignant fever, or plague, which deſtroyed a great proportion of one thouſand nine hundred and forty-ſix convicts, on board the hulks in the Thames (Colquhoun's Police of the Metropolis, chap. xii. p. 307), generated in the veſſels? and were there not local cauſes enough to excite it, without the importation and introduction of a fomes? Did not the peſtilential diſtemper which afflicted the Spaniſh captives at Wincheſter ariſe within the walls of their priſon, independent of any fomes introduced from without? Was not Hoſier's ſquadron, during the unfortunate expedition againſt Porto-Bello, diſmally diſabled by a diſtemper, bred on board and within the ſhips, wholly unaided by any thing like a fomes? And, if it was not ſuperfluous, I would aſk, whether malignant diſtempers did not harraſs, with their viſitations, almoſt all the great cities of Europe, and, indeed, of the world, until, by enforcing ſufficient laws againſt nuiſances, their inhabitants removed the cauſes?

In all theſe inſtances, dreadful as ſome of them were, the cauſes of the diſtempers were engendered or manufactured on the ſpot. Theſe exciting cauſes were, in all, exactly ſimilar to that which befouls a ſhirt, or the commoneſt article of clothing. If there is any difference of moment, it is nearly this: in one caſe peſtilence is manufactured upon a *great* ſcale, and, in the other, upon a *ſmall* one. The ſame principle pervades both caſes. The laws of nature operate uniformly in both: *and the ſame means that will cleanſe a ſhirt will purify a ſhip or a jail.* Subſtances that ſubdue acids, ſuch as OILS, CALCAREOUS EARTH, AND SOLUTIONS OF ALKALINE SALTS, CAN ACCOMPLISH THE WORK.

And if I interpret right that accurate mineralogiſt FERBER (Travels through Italy, letter xi. p. 129, edit. by Raſpe), the

catacombs, near the cities of Naples and Rome, are cut through and into maſſes of *tufo-ſtone*. This ſeems to conſiſt chiefly of volcanic aſhes, hardened into a ſubſtance of ſufficient compactneſs, in many caſes, for building: and thoſe afforded by Veſuvius, whether grey, white, brown, or yellowiſh, contain *alkaline* or *calcareous* particles enough to effervesce with acids. Hence the preſervation of human bodies in thoſe ſubterranean chambers can be eaſily accounted for. The lime preſerved theſe as the ſoda preſerved the mummies. SPALLANZANI has accounted for the preſence of this alkaline matter. In his very intereſting travels (Viaggi alle due Sicilië, &c. Pavia, 1792), he affirms, that a large tract of the Appenines, and the ſubſtratum of the volcanic country about Naples, conſiſt of the *carbonate of lime* (tom. i. p. 109—114). And as he has ſhewn that ſundry volcanic productions, particularly the vitrified lavas of the Lipari Iſlands, contain *muriatic acid* (tom. iii. p. 351), which, he thinks, is derived from the decompoſition of *common ſalt* (p. 361), *veramente del mare iſteſſo penetrante per di ſotto i monti volcanici*, penetrating from the ſea itſelf, beneath volcanic mountains, does it not follow, that its *ſoda* muſt be combined with other foſſils, and, perhaps, with the tufo?

There has been a number of tolerable conjectures on the preciſe nature of peſtilential matter. Beſides thoſe I have mentioned in other eſſays, I refer you now to the *Loimologia* of HODGES, a phyſician who reſided in the city of London during all the time of the plague of 1665. Obſerve how well he has gueſſed. In his § 1, on the Cauſe of a Peſtilence and a Contagion, he conſiders it as "ariſing chiefly from a "change or corruption of the *nitrous ſpirit* in the air" (p. 32 and 37). The *nitrous ſpirit* of this writer, as well as of his countryman and predeceſſor MAYOW, was evidently *vital* or *oxygenous air*; and, by its change or corruption, may be obviouſly underſtood, a combination of it with ſepton, the principle of putrefaction, or azote, the element hoſtile to life. To this change in the nitrous principle, Hodges aſcribes "blaſts upon trees and diſeaſes among cattle," as well as a peſtilence among mankind (p. 41); and to ſomewhat of *an acid*, ſometimes produced in this way, he attributes the quality of rain-water to ſtain the clothing and ſkins of travellers in the equatorial regions of Africa, and "burn upon them, "as it were, peſtilential characters" (p. 42). He affirms, too, what I have often witneſſed, that there is a great ſimili-

tude between a peſtilence and a ſcorbutic habit (p. 46); and declares (p. 49), that the convulſions and vellications of the ſtomach and alimentary canal are not owing to a putrefaction of bile, nor an eruption of fire, as the manner of thinking then was, but to this "vitiated ſaline ſpirit." This author makes favourable mention (p. 171) of ſpirit of hartſhorn (ammoniac), given in doſes of two ſcruples and one dram.

I ſhall, however, reſt the argument here for the preſent. If the reaſoning advanced eſtabliſhes the principle, then the principle ſo eſtabliſhed may be employed to explain innumerable other facts in nature belonging to this head. Your ſagacity will judge both of the rule and its application.

Be aſſured I am yours,

With high conſideration and reſpect,

SAMUEL L. MITCHILL.

REVIEW.

ART. I. *De Culturâ Radicis Brazilicæ; de Curâ Boum in Braziliâ; et de Culturâ Herbæ Nicotianæ in Braziliâ, Poemata Georgica: quibus adjicitur* PRUDENTII AMARALII *Brazilienſis de Sacchari Opificiò Carmen, &c.* 8vo. pp. 113. *Ulyſſipon.*

A VOLUME of American Georgics, written in Latin hexameter verſe, may be fairly pronounced a literary rarity: and yet the Portugueſe colony of Brazil has afforded ſuch a work. With great pleaſure we make known to our readers the literary labours of their countrymen on the ſouthern diviſion of the extenſive weſtern continent, and give them a curſory account of theſe pieces of didactic poetry, which, though not equal to the more laboured and formal PRÆDIUM RUSTICUM of the Jeſuit VANIER, are, however, performances of conſiderable merit and reſpectability. The author, though born in Oporto, appears to have been carried to Brazil very early, and to have been educated there (p. 61).

The firſt poem is on the cultivation of manioc (jatropha manihot), the plant whoſe root furniſhes the material of which caſſava-bread is made. It is divided into two books—the firſt of which treats of the culture, and the ſecond of the economical uſes of the vegetable. It is remarkable that the invocation, at the opening of the firſt book, is to St. Thomas the apoſtle, who, as the Brazilians report, penetrated into that region, and made the diſcovery of this moſt uſeful root; and, to prove it, they pretend to ſhow the impreſſions of his feet, as he walked over the rocks, ſtill remaining in many places. The author, whoſe name we regret that we have not been able to learn, after having given a circumſtantial deſcription of the manioc-plant, and particularly of its root, as well as of the manner of clearing the land of the natural growth of wood, and climbing vegetables, and alſo of the method of planting it, and the ſoil which ſuits it beſt, proceeds to enumerate the different animals who prey upon it, and the means of preventing their ravages: among others, he

is very minute on the ſubject of *ants*, as exceedingly injurious to the crop. We ſelect his deſcription of the mode of deſtroying theſe inſects by ſcalding water, as a ſpecimen of the ſtyle and talent of the writer.

——————— " Nimirum clauſtra ligone
" Convellunt, caecoſque cavos, et ſunditus omnes
" Perrumpunt cameras. Intùs ſecreta domorum
" Apparent reſerata: hic fractis horrea tectis,
" Plena latrociniis: illic cunabula prolis,
" Cuncta patent: trepidæ huc illuc, ſurſum atque deorſum
" Concurſant matres: fervet regnum omne tumultu.
" Tum verò expediunt flammis undantia ahena,
" Et ſuper invertunt: it largo flumine torrens
" Fumidus, et populum fugitantem ac multa timentem
" Obruit illabens, et funere mergit acerbo."

In the ſecond book, which treats of the ſcraping, grinding, ſoaking, and preſſing of the root, mention is made of the poiſonous quality of the ſweet liquor which is ſqueezed out from the plant while under preparation, and which kills brute animals as well as man. The white ſediment of this fluid is called the FLOUR OF MANIOC, and is an excellent part of the manufacture. If this liquor is boiled away to ſome thickneſs, it loſes its venomous quality, and acquires an agreeable taſte. The *cream-like* ſediment obtained by this operation is the TAPIOCA of commerce, and of medicine. The manner of procuring it is thus deſcribed:

" In fundo quidquid, defuſo humore, reſedit,
" Ad ſolem ſudumque loco curetur aprico,
" Perque dies aliquot, vivo de flumine ſumptis,
" Purgetur limphis, iterumque iterumque lavetur,
" Donec candorem adſciſcat, ſithonia qualem
" Nix habet: inde domi bene multis utile rebus
" Servandum: hanc etenim partem radicis et ipſe
" Commendat color excellens, et plurima virtus.
" In primis potis eſt triſtes depellere morbos.
" Seu fluxu infeſto pectus gravis afficit humor,
" Seu febris aſſiduæ paulatim eſt flamma medullas:
" Ægroti hoc capiant pulmenta ex pulvere: peſtem
" Illa domant, ægris ſenſim medicantia fibris."

The poet then treats of its medicinal virtues, and of the employment of it in baking cakes of ſeveral ſorts, with cautions againſt uſing it vainly as a coſmetic. He afterwards deſcribes the different ways of making it into bread, and of eating it; and gives an account, in detail, of the method employed, by the native Indians, to obtain from manioc-root, by chewing it, and ſetting the chewed maſs to ferment in the ſaliva with water, an intoxicating or maddening ſpirit. This leads him into an animated epiſode, too long for inſertion here, of the manner of fatting, killing and eating their captives in war, by the ſavages and cannibals of Brazil, worked up to phrenzy by the drink ſo prepared. Some further deſcription of the manners of the aborigines, and a recital of the recovery of the author from a threatened conſumption of the lungs by the uſe of manioc, concludes this poem.

To ſuch of our readers as wiſh a conciſe hiſtory of caſſava, without the ornaments of poetry, Mr. BRYANT's account of it, in his *Arrangement of Eſculent Plants*, will anſwer the purpoſes of general information.

The *ſecond* poem is on the "Management of cattle." Conſiderably different, indeed, from the part of VIRGIL's Georgics which is employed on the ſame ſubject, both as to the matter and manner of it, is this piece of American verſification. Here are few deſcriptions which are accommodated to the mild ſtate of cultivated Europe. Here are no ſheep and lambs to ſalute the reader with their bleating. In this performance, which is of the *Bucolic* form, the poet deſcribes not a little drove of cows and oxen grazing upon the fields of a ſmall Arcadian or Mantuan farm, but treats of the vaſt woods and ranges of Brazil, of the unnumbered herds of cattle turned out to feed during the ſeaſon, and browze in the wilderneſs; of the method of collecting as many as poſſible of them into pens; of caſtrating, marking, and branding them; and of the deſtruction made among them by the crows (urubuz), bats, panthers, and ſerpents. There is, however, a pleaſant, though ſhort account, of the cultivated country, and paſture lands, about Rio Janeiro (p. 33). We ſelect, as an example of the writer's ſkill, his deſcription of the manner in which cattle are bled to death by a large ſpecies of bat (p. 45).

"Multum etiam infeſtant alati paſcua mures,
"Veſpertina boum peſtis, qua triſtior arvis
"Nulla furit totis, bubulumque haurire cruorem

" Callidior: noctis ſub tempora ſcilicet alis
" Inſtrepit, armentumque petit, morſuque cruentat.
" At quo ſenſum adimat pecori, mira utitur arte.
" Dente bovem pungit, ſimul ore reciprocat auram,
" Atque fovet ſufflando cutem, ſopitque dolorem.
" Saucius haud ſentit bos vulnera, nec fugat hoſtem,
" Neſcius inſideat ſibi quantum in tergore monſtrum.
" Ergo inſtat, largèque cruorem fugit hirudo
" Aligera, et (ne plena crepet) quantum ebibit ore,
" Tantundem, alternis vicibus, fœdo egerit alvi
" Profluvio, donec ſaturata atque ebria, potu
" Abſtinet: interea vena demiſſus aperta
" It ſanguis ſine lege fluens: tum denique vires
" Deficiunt ægrum, et cum ſanguine vita relinquit."

The cultivation of the tobacco-plant in Brazil is the ſubject of the author's third poem. This is more ſportive and amuſing than either of the former; ſince, after offering his ſentiments on the growth, manufacture, and commerce of tobacco, he treats of the recreation of ſnuffing and ſmoking it with a good deal of humour and pleaſantry. He writes like one who could take a pinch of the one or a whiff of the other with a perfect reliſh. There are, nevertheleſs, ſome ſolemn verſes in this piece, as our readers will judge from the following ſhort extract on the ſlave-trade, wherein tobacco is bartered away for negroes along the coaſts of Africa.

——————— " At Nicotiana vel ipſos
" Glomera veliferis ratibus mittuntur ad Affros;
" Non tamen argenti vi permutanda vel auri,
" Sed certo juvenum numero; et quæ nautica pinus
" Nicotiis onerata glomis de littore ſolvit
" Braziliæ, vehit ecce viros, miſeriſque referta
" Mancipiis redit; arva quibus ſudore colenda,
" Vitaque perpetuos inter ducenda labores."

The verſification of theſe pieces is, in ſome inſtances, happy; and, generally, plain and deſcriptive. But the claſſical reader will find a conſiderable number of new words, which neither Maro nor his contemporaries would underſtand. Yet this is not a ſubject of blame; ſince new ideas behoved to be expreſſed in novel words; and we are inclined to think the author has great merit in getting over this difficulty with ſo

much addreſs as we diſcover. Lucretius complained of the poverty of the Roman language, and the want of expreſſions in it ſuitable to ſpeculative and philoſophical diſcuſſions. It is, then, no wonder if the author before us laboured under the preſſure of a heavier inconvenience, when he wrote in the Roman language, upon ſubjects ſo wholly unknown to the Romans as *manioc* and *tobacco*, and the *land* of *Brazil*, in which theſe two plants are cultivated. Still we obſerve ſome heavy lines, which border nearly upon proſe—ſome unclaſſical words and phraſes where the occaſion did not ſeem to require them—and ſome miſtakes of the preſs.

Our limits forbid us to enter into any minute account of the fourth poem in this collection, written by PRUDENTIUS AMARALIUS, *on the cultivation of cane, and the manufacture of ſugar*, as it appears to reſemble, in many reſpects, both as to ſtyle and manner, the pieces which precede it, and to poſſeſs no very prominent features of difference.

ART. II. *Fragments of the Natural Hiſtory of Pennſylvania. By* Benjamin Smith Barton, *M. D. Correſpondent Member of the Society of the Antiquaries of Scotland, &c. &c. Part firſt.* Philadelphia. *Printed for the Author by* Way *and* Groff. 1799. pp. 24. folio. *With an Introduction of* 18 *pages.*

THIS work, which is ſomewhat of a miſcellaneous caſt, is more employed on *ornithology* than on any other branch of natural hiſtory. The author endeavours to add new matter to the ſtock of information concerning the birds of the State in which he reſides, which may be conſidered as applying very nearly to what are called the middle States of the American Confederacy, lying between the rivers Potowmack and Hudſon. The body of the "Fragments" is divided into three ſections—the *firſt* of which treats of the birds which migrate during ſpring and ſummer; the *ſecond*, of thoſe which paſs from region to region in the fall and winter; and the *third*, of the reſident birds of Pennſylvania, or thoſe which abide there throughout the year.

To the regiſter of obſervations on the arrivals of the birds, is added a column of botanical occurrences, after the manner of a *calendarium floræ*; and another of miſcellaneous re-

marks, chiefly Meteorological and Zoological. Theſe comprize the firſt and ſecond ſections, which, we find, were begun to be kept in March, 1791, and end in February, 1792, and are comprehended in five half ſheets. The third ſection contains two half ſheets more. The appendix contains ſome obſervations on the greater number of birds mentioned in the tables.

The migration of birds is a very curious ſubject of natural hiſtory, and has generally been aſcribed, by obſervers, to that power or faculty denominated *inſtinct*. Profeſſor Barton, who has, for many years, been a witneſs of the motions of this claſs of animals, is of a contrary opinion, and oppoſes the notion that birds "never acquire any knowledge by ex-"perience." We are very glad to find him engaged in a work upon *the inſtinct of animals*, which is intended for publication (Introduc. p. 16, note). He promiſes, alſo, a *geographical view of the trees and ſhrubs of North-America* (p. 7); and a *memoir on that deſtructive inſect*, which we believe to be an indigenous ſpecies of tipula, *called the Heſſian-fly* (p. 23): as likewiſe parts *ſecond* and *third* of theſe "Fragments" (p. 24), if this *firſt* number is well received; and *an extenſive work on the vegetables of Pennſylvania and ſome of the adjoining States*; beſides ſeveral eſſays already announced in the courſe of our work, in 1797 (Medical Repoſitory, vol. i. p. 258 and 386), and which have not, as yet, been committed to the preſs, that we have heard of. It muſt be regretted, by all lovers of natural hiſtory, that a "want of leiſure" ſhould prevent the learned author's intention of offering to the world the fruits of his labours on theſe ſubjects, as well as from publiſhing "a num-"ber of tracts relative to the natural hiſtory of North-Ame-"rica, which have long laid in his cloſet." It appears to us that the *fragments*, and the other pieces mentioned, as far as we can judge from their titles, are but chapters, as it were, or ſubdiviſions, of what ought to be one great or general work on American natural hiſtory, and which would be abundantly more intereſting if time could be found for the induſtrious profeſſor to methodize them into a more regular form, or arrange them into a WHOLE. We have no doubt of the ſkill of the artiſt to put together his valuable materials in the ſhape of a ſtructure poſſeſſing both compactneſs and ſymmetry. We earneſtly hope the accompliſhment of this deſign, for which Dr. Barton ſeems to us to poſſeſs talents ſo emi-

nently and ſingularly befitting him. We do not agree with him in calling the matter he has collected "fragmentary rubbiſh." Rubbiſh is old ſtuff of buildings undergoing decay. Dr. Barton's are new materials for a grand edifice.

I. The SPRING and SUMMER MIGRATORY BIRDS of Pennſylvania, which he mentions, are the following:

1. Red-wing oriole (ſwamp black-bird), *(oriolus phœniceus)*.
2. Black-headed fly-catcher (pewe), *(muſcicapa fuſca* of Gmelin's edition of Linnæus Syſtema Naturæ).
3. Red lark *(alauda rubra)*. G.
4. Shore-lark (ſky-lark), *(alauda alpeſtris)*.
5. Little ſparrow (titt, chipping-bird), *(fringilla domeſtica.)* Auctoris.
6. Ferruginous finch (ground-ſparrow, hedge-ſparrow), *(fringilla ferruginea)*. G.
7. White-throated finch *(fringilla albicollis)*. G.
8. Black-throated ſparrow *(fringilla melodia)*.
9. Reed-ſparrow *(paſſer palauſtris* of Bartram).
10. Leaſt finch *(fringilla exilis)*. A.
11. Golden finch *(fringilla triſtis)*.
12. *(Fringilla pinus)*. A.
13. Red-breaſted nuthatch *(ſitta canadenſis)*. G.
14. Golden-wing woodpecker (flecker, or flicker), *(picus auratus)*.
15. Crow black-bird *(gracula quiſcula)*.
16. Cowpen-finch (cowpen-bird), *(fringilla pecoris)*.
17. Blue-bird *(motacilla ſialis)*.
18. Common ſnipe (wood-cock), *(ſcolopax gallinago)*.
19. Noiſy plover (kill-dee, kill-deer), *(charadrius vociferus)*.
20. Little wood-cock (meadow ſnipe), *(ſcolopax minor)*. G.
21. Purple martin *(hirundo purpurea)*.
22. Houſe-ſwallow *(hirundo ruſtica)*.
23. Little bank-martin *(hirundo ——)*.
24. Fiſhing-hawk *(falco piſcatorius)*.
25. Pine-creeper *(certhia pinus)*.
26. Little field-ſparrow *(fringilla graminea)*. G.
27. Golden-crowned warbler *(motacilla coronata)*. G.
28. Cærulean warbler *(motacilla cærulea)*. G.
29. Great blue or aſh-coloured heron *(ardea herodias)*.
30. Belted king-fiſher (king-fiſher), *(alcedo alcyon)*.
31. Greater loon, or diver (loon), *(colymbus ſeptentrionalis)*.

32. Eel-crow *(colymbus migratorius* of Bartram.)
33. Pied-bill grebe (dobchick), *(colymbus podiceps)*.
34. Canada-goose (wild-goose), *(anas canadenſis)*.
35. Buffel-duck *(anas bucephala)*.
36. White-faced teal *(anas diſcors)*.
37. Blue-winged teal *(anas fuſca)*.
38. The blue-bill *(anas ſubcærulea* of Bartram).
39. Mallard-duck *(anas boſchas)*.
40. Fan-creſted-duck *(mergus cucullatus)*.
41. Summer-duck *(anas ſponſa)*.
42. Carolina-pigeon (turtle-dove), *(columba corolinenſis)*.
43. Paſſenger-pigeon (wild-pigeon), *(columba migratoria)*.
44. Grey ſand-piper? (plover), *(tringa ſquatarola?)*.
45. Ferruginous thruſh (thruſh, thraſher) *(turdus rufus)*.
46 Night-heron (qua-bird), *(ardea nyctícorax)*.
47. Marſh-wren *(motacilla troglodytes)*.
48. Green-bittern, or poke *(ardea viresćens)*.
49. Houſe-wren, ſociable-wren *(certhia familiaris)*. A.
50. Towhee-bunting (towhee-bird, ground-robin, chewink), *(fringilla erythrophthalma)*.
51. Aculeated ſwallow (chimney-bird), *(hirundo pelaſgia)*.
52. Whip-poor-will, or night-hawk *(caprimulgus virginianus)*. G.
53. King-bird, tyrant *(lanius tyrannus)*.
54. Baltimore-oriole, Baltimore-bird (hang-bird), (*oriolus Baltimore*).
55. Baſtard-oriole, baſtard-Baltimore (*oriolus ſpurius*).
56. Cat fly-catcher (cat-bird), (*muſcicapa carolinenſis*).
57. White-poll warbler (*motacilla varia*).
58. Summer yellow-bird (*parus luteus*).
59. Water wag-tail (*motacilla fluvialis*).
60. Warbling-wren, or green-wren (*muſcicapa fuſca*). Cateſby.
61. Red-throated honey-ſucker (humming-bird), (*trochilus colubris*).
62. Yellow-breaſt warbler (Maryland yellow-throat), (*turdus trichas*). G.
63. Red-headed wood-pecker (*picus erytrocephalus*).
64. Golden-crowned-thruſh (*motacilla aurocapilla*).
65. Canada tanager (ſwamp red-bird?), (*tanagra rubra*).
66. (*Muſcicapa ſubfuſca* of Bartram).
67. Red-eyed fly-catcher (*muſcicapa olivacea*).
68. Black-headed warbler (*muſcicapa ruticilla*).

69. Wood-thruſh, little-thruſh (*turdus minor*). G.
70. Brent-gooſe (*anas bernicla*).
71. Creſted fly-catcher (*muſcicapa crinita*).
72. Yellow-breaſted chat (*muſcicapa viridis*). G.
73. Sparrow-hawk (*falco ſparverius*).
74. Indigo-bunting, blue-linnet (*tanagra cyanea*).
75. Cuckoo of Carolina (*cuculus americanus*).
76. Creſcent ſtare (meadow-lark), (*alauda magna*).
77. Creeping titmouſe, finch creeper (*parus americanus*).
78. Hooded titmouſe (*motacilla mitrata*).
79. Black-throat warbler, blue fly-catcher (*motacilla canadenſis*). G.
80. Spotted ſand-piper (*tringa macularia*). G.
81. Golden-winged fly-catcher (*motacilla chryſoptera*).
82. Red-headed warbler (*motacilla petechia*).
83. Green warbler (*motacilla virens*).
84. Bloody-ſide warbler (*motacilla pennſylvanica*).
85. Olive-coloured fly-catcher, or leſſer pewe (*muſcicapa rapax* of Bartram).
86. Marſh-bittern (*ardea cinerea*).
87. Rice-bunting (rice-bird, reed-bird, bob-lincoln?), (*emberiza oryzivora*).
88. Soree gallinule (*rallus carolinus*). G.
89. Virginian rail (*rallus virginianus*).
90. Clapper-rail (meadow-clapper?), (*rallus crepitans*). G.
91. Common coot (*fulica atra*).
92. The little ſtriped bittern (*ardea parva* of Bartram).
93. Calandra-lark (May-bird, graſs-bird), (*alauda calandra*).
94. Worm-eater (*motacilla vermivora*). G.
95. Great yellow-throated-wren of Florida (*certhia floridana*). A.
96. Carrion-vulture (turkey-buzzard), (*vultur aura*).
97. Great white-heron (*ardea alba*).
98. Little white-heron (*ardea æquinoctialis*).
99. Swallow-tailed falcon (*falco furcatus*),
100. Rice-bunting (rice-bird, reed-bird). The females excluſively? make their appearance. (*Emberiza oryzivora*).

II. The AUTUMNAL AND WINTER BIRDS of paſſage in his catalogue are not ſo numerous, viz.

1. (*Parus domeſticus*).
2. Creſted titmouſe (*parus bicolor*)

3. Virginian titmouſe, yellow-rump (*parus virginianus*).
4. Prib-chatterer (cedar-bird), (*ampelis garrulus*).
5. Blue and green wing teal (*anas querquedula*).
6. Black duck (*anas nigra*).
7. Mallard (*anas boſchas*).
8. Virginian titmouſe (*parus virginianus*).
9. Canada-gooſe (*anas canadenſis*).
10. Yellow-bellied wood-pecker (*picus varius*).
11. Golden-crowned wren (*motacilla regulus*).
12. Ruby-crowned warbler (*motacilla calendula*).
13. Cat-bird (*muſcicapa carolinenſis*).
14. Wood-cock (*ſcolopax gallinago*).
15. Brent-gooſe (*anas bernicla*).
16. Snow-bird (*fringilla hudſonias*).
17. Fox-coloured ſparrow (*fringilla ferruginea*).
18. Large brown ſparrow, with red eye-brows (*fringillæ albicollis*).
19. Little falcon (*falco ſparverius*).
20. Sharp-winged day-owl (*ſtrix diurnalis*). A.
21. Greater redpoll? (*fringilla cannabina?*).
22. Carolina-pigeon (*columba carolinenſis*).
23. Greater redpoll? (*fringilla cannabina?*).
24. Snow-bunting (*emberiza nivalis*).
25. Tawney-faced owl (*ſtrix ſtridula?*).
26. Great-white-owl (*ſtrix nyctea?*).
27. Shore-lark (ſky-lark), (*alauda alpeſtris*).
28. Red-lark (*alauda rubra*). G.
29. Pine-finch (*fringilla pinus*). A.
30. Ferruginous finch (*fringilla ferruginea*).
31. White-throated finch (*fringilla albicollis*). G.
32. Golden-finch (*fringilla triſtis*).

III. The RESIDENT BIRDS enumerated are:

1. White-headed eagle (bald-eagle), (*falco leucocephalus*).
2. Great grey eagle (*falco regalis* of Bartram).
3. Great red-tailed hawk (*falco aquilinus* of Bartram).
4. Pigeon-hawk (*falco columbarius*).
5. Bluiſh-hawk (*falco glaucus* of Bartram).
6. Great horned owl (*ſtrix virginiana*).
7. Red owl, little owl (ſcreech owl), (*ſtrix aſio*).
8. Hen owl (*ſtrix varius* of Bartram).
9. Great ſhrike (guſt-bird? nine-killer), (*lanius excubitor*).

10. Red-backed ſhrike (*lanius collurio?*).
11. Raven crow (raven), (*corvus corax*).
12. Carrion crow (crow), (*corvus corone*).
13. Blue-crow (blue-jay, jay-bird), (*corvus criſtatus*).
14. Pileated wood-pecker (wood-cock), (*picus pileatus*).
15. Red-headed wood-pecker [*picus erythrocephalus*].
16. Golden-wing wood-pecker [*picuſauratus*].
17. Hairy wood-pecker [*picus villoſus*].
18. Downy wood-pecker [*picus pubeſcens*].
19. Black-headed nuthatch [ſap-ſucker], [*ſitta*].
20. Brown-creeper [*certhia fuſca* of Bartram].
21. Great heron [*ardea herodias*].
22. Noiſy plover [kill-dee, kill-deer], [*charadrius vociferus*].
23. Wild-turkey [*meleagris gallopavo*].
24. Ruffed grous [grous], [*tetrao umbellus*].
25. Pheaſant of Pennſylvania [pheaſant], [*tetrao cupido.*]
26. Maryland partridge [partridge, quail], [*tetrao virginianus*].
27. Paſſenger-pigeon [wild-pigeon], [*columba migratoria*].
28. Carolina-pigeon [turtle-dove], [*columba carolinenſis*].
29. Creſcent ſtare [meadow-lark], [*alauda magna*].
30. Read-breaſted thruſh [robin], [*turdus migratorius*].
31. Mimic thruſh [mocking-bird], [*turdus polyglottos*].
32. Prib chatterer [cedar-bird,] [*ampelis garrulus.*]
33. Cardinal Groſbeak [Virginia nightingale,] [*loxia cardinalis*].
34. Croſs-bill [ſhear-bird], [*loxia curviroſtra*].
35. [Blue-bird], [*motacilla ſialis*].
36. [Marſh-wren], [*motacilla troglodytes?*].
37. Toupet titmouſe [*parus bicolor*].
38. Canada titmouſe, little pied titmouſe [*parus atricapillus*].
39. Virginian titmouſe [*parus virginianus*].

The introduction of the work conſiſts of thirty articles, or paragraphs, full of inſtructive ſentences, the reſult of much patient and diligent inquiry, and which it is not eaſy to abridge or analyze.

As we have in our poſſeſſion a manuſcript of Dr. Mitchill's, kept, during the ſpring of 1787, at Plandome, on Long-Iſland, we ſhall exhibit from it a few comparative remarks of the arrival and departure of ſome migratory birds of the maritime parts of New-York; being aware, at the ſame time, that the migration of birds being *an act of their volition*,

their annual flights are governed by various accidents, and particularly by the greater or leſs forwardneſs of the ſeaſon; and that, therefore, further obſervations will be neceſſary to render the compariſons complete. They will, however, add ſomething to the ſtock of facts.

MIGRATIONS *in the vicinity of Philadelphia*—1791.

April 15. Wild-gooſe *(anas canadenſis)*, arrived in Pennſylvania.

March 12. *Gracula quiſcula?* (crow black-bird)—*picus auratus* (golden-wing wood-pecker—*muſcicapa fuſca* (pewe)—*fringilla domeſtica* (chipping-bird)—arrived.

March 15. *Motacilla ſialis* (blue-bird).

April 15. *Alcedo alcyon* (king-fiſher)—*hirundo ruſtica* (houſe-ſwallow)—come.

April 18. *Turdus rufus* (ferruginous thruſh)—*ardea nyctlicorax* (night-heron)—make their appearance.

April 20. *Ardea virefcens* (green bittern or poke)—ſeen.

April 23. *Caprimulgus virginianus* (whip-poor-will, or night-hawk)—*oriolus Baltimore* (hang-bird)—*lanius tyrannus* (king-bird)—and *fringilla erythrophthalmia* (chewink)—come.

MIGRATIONS *in the neighbourhood of Plandome*—1787.

March 16. Wild-geeſe fly away to the northward, from the ſouth ſide of Long-Iſland, where they winter.

March 19. Black-birds, blue-birds, and chipping-birds, arrived from the warmer latitudes.

March 20. *Golden-wing wood-pecker*, or *clape*—*pewe* or *phœbe-bird*—*king-fiſhers* and *houſe-ſwallows*—ſeen. *Robins* ſinging about the houſe *(turdus migratorius)*.

April 28. *Brown-thruſhes* and *night-hawks* make their appearance. The *whip-poor-will*, which is conjectured, by ſome, to be the female of the common night-hawk, firſt heard on the 5th of May.

May 1. Night-barkers and ſhite-pokes arrived.

May 2. Hanging-birds, king-birds, and cheurinks, arrived.

As Profeſſor Barton's work is chiefly a record of facts, we recommend it to our readers who are deſirous of more minute information than our limits permit us to give. The utility, however, of the following remarks on *inſects, as the food of birds*, recommends them to us as worthy of being inſerted entire.

"It may, in the firſt place, be obſerved, that inſects appear to be the firſt food of almoſt all the birds of our country. The more I have inquired, the more I have been convinced, that almoſt all birds live, in ſome meaſure, upon inſects. Even thoſe ſpecies which conſume conſiderable quantities of ſeeds, berries, and fruit, alſo conſume large quantities of inſects: and there are reaſons to believe, that others, whoſe principal food is the nectar of plants, alſo live partly upon theſe inſects. Thus Mr. Brandis found the veſtiges of inſects in the ſtomach of the trochilus, or humming-bird, one of the

laſt birds one would have ſuſpected of feeding on animal food.

" The greater number of our ſmaller birds, of the order of *paſſeres*, ſeem to demand our attention and protection. Some of them feed pretty entirely upon inſects, and others upon a mixed food—that is, inſects and the vegetable ſeeds, &c. Many of them contribute much to our pleaſure by the melody of their notes. I believe the injury they do us is but ſmall compared to the good they render us. I ſhall mention, under ſix different heads, a few of the uſeful birds of this and ſome other orders.

" I. *Muſcicapa acadica* of Gmelin? This is the leſſer creſted fly-catcher of Pennant. It is called, in Pennſylvania, the leſſer or wood-pewe. This little bird builds in woods and in foreſts. After the young have left the neſts, the parents conduct them to the gardens and habitations of men. Here the whole brood dwells in trees near the houſes, where they are fed with the common houſe-fly, and other inſects that are caught by the old birds. The young ones are ſoon capable of obtaining their food in the ſame way. This ſpecies of muſcicapa viſits us in the ſpring, and commonly continues with us until late in September, when it retires ſoutherly to winter.

" II. The *motacilla ſialis*, or blue-bird, feeds principally, if not entirely, upon inſects, both ſuch as are flying and ſuch as are reptile. It is ſaid they eat currants.

" III. Moſt of our ſpecies of picus, or wood-pecker, appear to me to be very uſeful in deſtroying inſects, particularly thoſe which injure our foreſt and orchard trees. It is true, theſe birds are ſometimes injurious to us, by eating ſome of our fineſt fruits, particularly our cherries, and, therefore, pains are taken to expel them from our gardens. But they devour vaſt numbers of inſects, particularly ſome of thoſe ſpecies which prove ſo deſtructive to the trunk of the trees, ſuch as the coleopterous inſects, which, perhaps, do as much miſchief as the caterpillars.

" IV. As a devourer of pernicious inſects, one of the moſt uſeful birds with which I am acquainted is the houſe-wren, or *certhia familiaris?* This little bird ſeems peculiarly fond of the ſociety of man, and it muſt be confeſſed, that it is often protected by his intereſted care. From obſerving the uſefulneſs of this bird in deſtroying inſects, it has long been a cuſtom, in many parts of our country, to fix a ſmall

box at the end of a long pole, in gardens, about houſes, &c. as a place for it to build in. In theſe boxes they build and hatch their young. When the young are hatched, the parent birds feed them with a variety of different inſects, particularly ſuch as are injurious in gardens. One of my friends was at the trouble to obſerve the number of times a pair of theſe birds came from their box, and returned with inſects for their young. He found that they did this from forty to ſixty times in an hour; and, in one particular hour, the birds carried food to their young ſeventy-one times. In this buſineſs they were engaged the greater part of the day; ſay twelve hours. Taking the medium, therefore, of fifty times in an hour, it appeared that a ſingle pair of theſe birds took from the cabbage, ſallad, beans, peas, and other vegetables in the garden, at leaſt ſix hundred inſects in the courſe of one day. This calculation proceeds upon the ſuppoſition, that the two birds took each only a ſingle inſect each time. But it is highly probable they often took ſeveral at a time.

" The ſpecies of certhia of which I am ſpeaking generally hatches twice during the courſe of the ſummer. They are very numerous about Philadelphia, and in other parts of the United States.

" The fact juſt related is well calculated to ſhow the importance of attending to the preſervation of ſome of our native birds. The eſculent vegetables of a whole garden may, perhaps, be preſerved from the depredations of different ſpecies of inſects by ten or fifteen pair of theſe ſmall birds: and, independently of this eſſential ſervice, they are an extremely agreeable companion to man; for their note is pleaſing. A gentleman, in the neighbourhood of Philadelphia, thinks he has already reaped much advantage from the ſervices of theſe wrens. About his fruit trees he has placed a number of boxes for their neſts. In theſe boxes they very readily breed, and feed themſelves and their young with the inſects which are ſo deſtructive to the various kinds of fruit trees, and other vegetables.

" V. The ſervices of the ibis, in devouring the reptiles of Egypt, are well known. They procured to this bird a veneration and regard which form an intereſting fact in its hiſtory, and in the hiſtory of human ſuperſtitions. The ſtorks are, perhaps, not leſs uſeful. Pliny tells us, that theſe birds were ſo much regarded for deſtroying ſerpents, that, in Theſſaly, in his age, it was a capital crime to kill them,

and that the punifhment was the fame as that for murder. Virgil hints at the ufefulnefs of the ftork when he defcribes it as 'longis invifa colubris.' In Holland, even in our times, they go wild, protected by the government, from a fenfe of their ufefulnefs in the way I have mentioned.

" In Britain, if it were not for the herons, and fome other birds of this tribe, the frogs, and toads, and other reptiles, would increafe to fo great a degree as to prove a real nuifance. North-America abounds with birds of this order; and we even have fome fpecies of ibis, very nearly allied to the ibis of Egypt—fuch as the *tantalus loculator*, or wood-pelecan, the *tantalus ruber*, or fcarlet ibis, the *tantalus fufcus*, or brown ibis, and the *tantalus albus*, or white ibis. Mr. Bartram informs us, that the firft of thefe birds feeds 'on ferpents, 'young alligators, frogs, and other reptiles.' It is commonly feen 'near the banks of great rivers, in vaft marfhes or meadows, 'efpecially fuch as are caufed by inundations, and alfo in the 'vaft deferted rice plantations.' This bird, both with regard to his general afpect, and his manners and habits, may be confidered as the ibis of America. In the midft of all their fuperftitions, I do not find, however, that the native Americans have ever paid any particular regard to this bird. I cannot learn that any of thefe fpecies of tantalus have ever been feen in Pennfylvania.

" VI. Some of the birds of the vultur-kind are extremely ufeful to man, by deftroying immenfe quantities of carrion, which ferve to vitiate the air, and, perhaps, in fome inftances, to give rife to malignant epidemics. The *vultur aura*, or turkey-buzzard of our country, is one of the moft ufeful of thefe birds. In Virginia it is protected by a law of that State. The Abbé Clavigero fpeaks of the ufefulnefs of the *cozcaquauhtli*, or king of the zopilots, the *vultur papa* of Linnæus. 'The zopilot,' fays this writer, 'is a moft ufeful 'bird to that country (Mexico); for they not only clear the 'fields, but attend the crocodiles, and deftroy the eggs which 'the females of thofe dreadful amphibious animals leave in 'the fand, to be hatched by the heat of the fun. The de'ftruction of fuch a bird ought to be prohibited under fevere 'penalties.'

" I am fenfible that thefe few facts, which are thrown together without any regard to order, can be of little ufe, except in as far as they may turn the attention of other perfons, who poffefs more leifure and information than myfelf, to the

ſubject, which is at once curious and important. It appears to me to be a ſubject peculiarly intereſting to my countrymen. Perhaps few parts of the world are more infeſted with noxious inſects than the United States. The greater number of theſe inſects are, I believe, natives of the country, though our partiality to the ſoil which gave us birth has not always allowed us to acknowledge this truth. Thus we give to the Heſſians the honour of introducing among us that moſt pernicious inſect, the Heſſian-fly, which, for ſeveral years, has committed, and ſtill commits, ſuch alarming ravages on ſome of our moſt valuable grains, particularly the wheat and the rye. But this inſect is, undoubtedly, a native of America. How it came to be, for ſo long a time, overlooked, will probably be mentioned in a memoir, concerning this and other noxious inſects, which I hope to publiſh.

" Many of the pernicious inſects of the United States ſeem to be increaſing inſtead of diminiſhing. Some of theſe inſects, which originally confined their ravages to the native or wild vegetables, have ſince begun their depredations upon the foreign vegetables, which are often more agreeable to their palates. Thus the *bruchus piſi*, or pea-fly, is a native, and ſeems originally to have fed, in a great meaſure unnoticed, upon the indigenous vegetables which are allied to the pea: but ſince the introduction of this laſt among us, it is the principal, if not the only, vegetable which ſuffers from the ravages of this inſect. The Heſſian-fly could not originally have inhabited the wheat, the rye, and other ſimilar gramina of this kind, for theſe vegetables are not natives of America. It is now more formidable to us than would be an army of twenty thouſand Heſſians, or of any other twenty thouſand hirelings, ſupplied with all the implements of war. The caterpillar, which has begun its ravages upon the leaves of the Lombardy poplar, that contributes ſo much to beautify our city, is, moſt probably, a native of our woods. It prefers this fine foreigner to the leſs palatable leaves upon which it has been formerly accuſtomed to feed. Other inſtances of this kind might be mentioned. They ſhow how very neceſſary it is to watch the migrations of inſects from the native to the introduced vegetables; and they teach us a truth, not, I think, ſufficiently attended to by naturaliſts, that different kinds of inſects are much leſs confined to vegetables of the ſame ſpecies, or to ſpecies of the ſame genus, than has been commonly imagined. It is certain, that the ſame ſpecies of inſects,

in America, often feeds indiſcriminately, and in ſucceſſion, upon plants of very oppoſite genera, and even of very different natural orders.

"Hitherto too little progreſs has been made among us in the diſcovery of remedies for the great miſchiefs occaſioned by inſects. The ſubject has not been examined with ſufficient attention. It has given place to diſcuſſions and inquiries of very inferior utility; and, I fear, it will not claim all that induſtrious attention which it ſo well merits, until the evil ſhall have ſpread ſtill farther. It is, doubtleſs, difficult, but it is by no means impoſſible, to prevent the ravages of noxious inſects. In this important buſineſs ſomething has already been done in our country. We have diſcovered a method of diminiſhing the depredations of the little bug, called cucumber-fly, which proves ſo deſtructive to the cucurbitaceous vines, particularly thoſe of the cucumber and muſk-melon. By manuring our wheat lands, and thereby increaſing the ſtrength and vigour of the wheat, we have leſſened the evil of the Heſſian-fly. By ſuſpending, to our young apple, and other trees, pieces of tow, impregnated with a mixture of brimſtone and train-oil, we have learned how to frighten away the periodical locuſts (*cicada ſeptemdecim* of Linnæus), which often do ſo much injury to our orchards. The American Philoſophical Society, by calling the attention of the public to the decay of our peach-trees, has brought us to a better acquaintance with the cauſes of this decay, and with the means of preventing it. Inſects are, no doubt, one of theſe cauſes. We have made ſome progreſs in preventing the miſchief of the *bruchus piſi*, or pea-fly, which proves ſo deſtructive to one of the fineſt eſculent vegetables. But all that has yet been done is very little, compared to that which remains to be done. The ſubject is as new as it is important."

ART. III. *Three Lectures upon Animal Life, delivered in the Univerſity of Pennſylvania. By* Benjamin Ruſh, *M. D. &c. Philadelphia.* Dobſon. 1799. 8vo. pp. 84.

THOUGH the phenomena and changes of life are inceſſantly taking place before our eyes and within our bodies, yet they appear to be ſtill very imperfectly known. The elements of the ſcience of animal life have ſcarcely been in-

veſtigated with more ſucceſs than thoſe of intellectual nature. In both the progreſs has been impeded by a multitude of difficulties, which nothing but a cloſe view of the ſubject can enable the inquirer to perceive. The employment of the mind in comparing and diſcriminating ideas, and the exerciſe of the muſcles in moving the limbs, are ſo familiarized by habit as to be often performed without conſciouſneſs of the operation. But if the mind be turned inward upon itſelf, to trace the origin and modes of its functions, or if we narrowly inquire into the cauſe of muſcular action, it will be found that our ſimpleſt faculties are involved in myſtery and darkneſs, and that we are ignorant of nothing more than of ourſelves.

The lectures before us form a part of the fundamental doctrines which are taught by the learned author, in quality of Profeſſor of the Inſtitutes of Medicine in the Univerſity of Pennſylvania. He adopts, and accommodates to his deſign, the leading principles of the ſyſtem of the late Dr. Brown; rejecting, at the ſame time, with great correctneſs of diſcrimination, ſeveral of the raſh opinions maintained by that bold and eccentric theoriſt. We cannot agree with Dr. Ruſh in aſcribing to Dr. Cullen the credit of originally developing what he ſuppoſes to form the foundation of the Brunonian ſyſtem. With all our reverence for the memory of Dr. Cullen, we are unable to find, throughout the whole of his works, any diſtinct indication of thoſe luminous truths which are unfolded in the "Elements" of his contemporary and rival. It might, perhaps, be aſſerted with more juſtice, that Brown's doctrine of ſtimulus was founded originally upon Haller's diſcovery of muſcular irritability; though it muſt ſtill be maintained, that the Brunonian principles are extended far beyond any thing that appears ever to have entered the mind of Haller.

According to our author, the conſtituents of perfect life, in the human body, are *motion*, *ſenſation*, and *thought*, united. The difficulty of defining animal life in ſuch manner as to include all its variations, and alſo to diſtinguiſh it from vegetable life, will readily occur.

Before proceeding to the detail of the ſubject, Dr. R. delivers the three following propoſitions:

"I. Every part of the human body (the nails and hair excepted) is endowed with ſenſibility, or excitability, or with both of them."

" II. The whole human body is ſo formed and connected, that impreſſions made in the healthy ſtate upon one part, excite motion or ſenſation, or both, in every other part of the body."

" III. Life is the EFFECT of certain ſtimuli acting upon the ſenſibility and excitability, which are extended, in different degrees, over every external and internal part of the body."

In the firſt place, Dr. R. conſiders animal life, as it appears in the waking and ſleeping ſtates in a healthy adult; and he afterwards inquires into the modification of its cauſes in the fœtal, infant, youthful, and middle ſtates of life, in certain diſeaſes, in different ſtates of ſociety, in different climates, and in different animals.

According to the third general propoſition, Dr. R. aſcribes all the actions and ſenſations of the body to the operation of ſtimuli acting upon the organs of ſenſe and motion. Theſe ſtimuli he divides into external and internal. The external are light, ſound, odors, air, heat, exerciſe, and the pleaſures of the ſenſes. The internal ſtimuli are food, drinks, chyle, the blood, a certain tenſion of the glands which contain ſecreted liquors, and the exerciſes of the faculties of the mind. Each of theſe is treated of particularly in the order in which they have been mentioned. And an account of the condition of life in different parts of the day concludes the firſt lecture.

In the ſecond lecture Dr. R. obſerves, that " the ſtimuli which have been enumerated, when they act collectively and within certain bounds, produce a healthy waking ſtate. But they do not always act collectively, nor in the determined and regular manner deſcribed. There is, in many ſtates of the ſyſtem, a deficiency of ſome ſtimuli, and, in ſome of its ſtates, an apparent abſence of them all." To account for the continuance of animal life under ſuch circumſtances, Dr. R. lays down two propoſitions.

" I. The healthy actions of the body, in the waking ſtate, conſiſt in a proper degree of excitability and excitement."

" In an exact proportion, and a due relation of both, diffuſed uniformly throughout every part of the body, conſiſts good health. Diſeaſe is the reverſe of this. It depends, *in part*, upon a diſproportion between excitement and excitability, and in a partial diſtribution of each of them."

" II. It is a law of the ſyſtem, that the abſence of one natural ſtimulus is generally ſupplied by the increaſed action of others."

Having ſtated theſe propoſitions, Dr. R. proceeds next to inquire into and explain the different degrees and ſtates of animal life, as variouſly exhibited in ſleep—in the fœtus—in infants—in youth and middle age—in old age—in perſons who are blind, deaf and dumb—in idiots—in perſons under the effect of long faſting—and in perſons ſuppoſed to be dead, from drowning, freezing, and other cauſes.

In the third lecture Dr. R. takes a view of the ſtate of animal life in the different inhabitants of our globe, as varied by the circumſtances of civilization, diet, ſituation and climate. As a ſpecimen of the manner in which this part of the ſubject is treated, we ſelect the following:

"Let us next turn our eyes to the miſerable inhabitants of thoſe eaſtern countries which compoſe the Ottoman empire. Here we behold life in its moſt feeble ſtate, not only from the abſence of phyſical, but of other ſtimuli which operate upon the inhabitants of other parts of the world. Among the poor people of Turkey there is a general deficiency of aliment. Mr. Volney, in his travels, tells us, 'That the diet of the Bedouins ſeldom exceeds ſix ounces a 'day, and that it conſiſts of ſix or ſeven dates ſoaked in 'butter-milk, and afterwards mixed with a little ſweet-milk, 'or curds.' There is, likewiſe, a general deficiency among them of ſtimulus, from the operations of the mental faculties; for ſuch is the deſpotiſm of the government in Turkey, that it weakens not only the underſtanding, but it annihilates all that immenſe ſource of ſtimuli which ariſes from the exerciſe of the domeſtic and public affections. A Turk lives wholly to himſelf. In point of time, he occupies only the moment in which he exiſts; for his futurity, as to life and property, belongs altogether to his maſter. Fear is the reigning principle of his actions, and hope and joy ſeldom add a ſingle pulſation to his heart. Tyranny even impoſes a reſtraint upon the ſtimulus which ariſes from converſation; for 'They ſpeak (ſays Mr. Volney) with a ſlow feeble voice, 'as if the lungs wanted ſtrength to propel air enough through 'the glottis to form diſtinct articulate ſounds.' The ſame traveller adds, that 'They are ſlow in all their motions, that 'their bodies are ſmall, that they have ſmall evacuations, and 'that their blood is ſo deſtitute of ſeroſity, that nothing but 'the greateſt heat can preſerve its fluidity.' The deficiency of aliment, and the abſence of mental ſtimuli, in theſe people, is ſupplied,

"1. By the heat of their climate;

"2. By their paſſion for muſical ſounds and fine clothes; and,

"3. By their general uſe of coffee and opium.

"The more debilitated the body is, the more forcibly theſe ſtimuli act upon it. Hence, according to Mr. Volney, the Bedouins, whoſe ſlender diet has been mentioned, enjoy good health; for this conſiſts not in ſtrength, but in an exact proportion being kept up between the excitability of the body, and the number and force of the ſtimuli which act upon it."

In purſuance of his plan, the author then goes on to mention certain mental ſtimuli, which act nearly alike in the production of animal life upon the individuals of all the nations in the world. Theſe are, the deſire of life—the love of money—public amuſements—the love of dreſs—novelty—the love of fame—the love of country—and the different religions of the world.

Under the guidance of the ſame principles which conduct the author's inquiries concerning the human ſpecies, he proceeds, in the next place, to examine the cauſes of life in all the different claſſes of animals, which he finds remarkably to obey the ſame laws that govern the human body.

He finds, alſo, additional ſupport to his doctrine of animal life, by adverting to the manner in which life and growth are produced in vegetables. Vegetable life, he maintains, is as much the offſpring of ſtimuli as animal, and ſkill in agriculture conſiſts chiefly in the proper application of theſe.

In order ſtill further to eſtabliſh the principles here laid down, the author contraſts the cauſes of life with the cauſes of death, and particularizes the various modes in which this cataſtrophe of the body is effected by the changes induced by old age or diſeaſes.

The ſubject is concluded by inferences, drawn from the doctrine of animal life being the effect of impreſſions upon the body, which ſhow its extenſive application to medicine, metaphyſics, theology and morals.

Throughout the whole of this performance Dr. R. expreſſes himſelf with a very commendable diffidence, whenever the queſtion ariſes concerning the nature of the vital principle of animals. "Should it be aſked," ſays he, "what is that peculiar organization of matter which enables it to emit life, when acted upon by ſtimuli, I anſwer, I do not know." On this point, and on ſeveral others of a ſimilar kind, our au-

thor confines himſelf to a ſtatement of facts, wiſely concluding that, in the preſent ſtate of our knowledge of this ſubject, little advantage could ariſe from conjecture or hypotheſis. The author of Zoonomia has, indeed, ventured to ſtep upon this uncertain ground, and, with great plauſibility, attributes the contractions of animal fibres, as well in the muſcles as in the organs of ſenſe, to the action of a ſubtile fluid, which he calls *ſenſorial power*, or the *ſpirit of animation*. Before Dr. Darwin, no perſon had ſo formally attempted to inveſtigate the laws and arrange the phenomena of this attenuated fluid, ſuppoſed to produce the actions of animal life. Notwithſtanding all the ingenuity which Dr. Darwin beſtows upon his doctrine of ſenſorial power, there are ſolid objections to the aſſumption of ſubtile fluids and of occult qualities, which equally elude conception and experiment. And we conceive that the warmeſt admirers of Zoonomia, whatever degree of probability may be aſſigned to this hypotheſis, muſt admit that it is incapable of abſolute proof.

The brief expoſition of the contents of theſe lectures, which our limits permit us to give, will, we hope, ſerve as an incentive to the reader to peruſe the whole performance. And, we truſt, the author will hereafter be prevailed upon to lay before the public a more complete view of that courſe of inſtruction which he now delivers in the Univerſity of Pennſylvania, ſo greatly to the gratification and improvement of his numerous pupils.

ART. IV. *Occaſional Reflections on the Operation of the Small-Pox; or the Traveller's Pocket-Doctor. By* Joſeph Hamilton, *Phyſician.* Catſkill. *Croſwell.* pp. 45. 12mo. 1799.

THE reaſon of our noticing this ſmall eſſay is not ſo much on account of any thing new, or not generally known, contained in it, on the diſeaſe which the writer profeſſes to conſider, as becauſe we think his remarks on the adminiſtration of the mild muriate of quickſilver (calomel), in fevers worthy of being preſented to our readers. The quotation will exhibit, at once, a ſketch of his manner of thinking, and of expreſſing his thoughts.

"As I have, in this diſcourſe, been pretty liberal in my

recommendations of the uſe of calomel in fevers, and in large doſes; and as the prejudices againſt the uſe of this moſt ineſtimable medicine do ſtill prevail to a conſiderable degree, even among ſome of the moſt learned phyſicians, to the great hindrance, as I think, of the growth of the knowledge of the healing art, I cannot conſent to commit this little work to the preſs, without firſt remarking that, as early as the year 1783, I publiſhed a ſhort diſcourſe on mercury, in which it was then obſerved, that I had been in the uſe of calomel, as my moſt common febrifuge, for the ſpace of about twelve years, and recommended the uſe of it to the world, to be given in doſes, from 8 to 35 grains. The printed pamphlet, by ſome means, fell into the hands of the Society for the Encouragement of Arts, Sciences, &c. at Boſton. That honourable ſociety appeared to view it as a dangerous publication, and appointed a committee to obſerve thereon, whoſe animadverſions appeared by no means to be entirely deſtitute of aſperity. They were tranſmitted to me in a letter from Governor Bowdoin, their then preſident. The committee would not believe the facts, ſtated in my publication, that the uſe of calomel, in large doſes, in fevers, had been ſalutary. There were contained in the *report*, made by the honourable profeſſor of phyſic, theſe words, viz. 'I believe 'that mankind are not yet ſo happy.' Hereupon I found my reputation at ſtake. In order, therefore, to prove thoſe facts, I was at very conſiderable trouble and expenſe to collect, from various parts of the State of Connecticut, numbers of affidavits, taken before the civil magiſtrate and ſealed, which I tranſmitted to the ſociety for their ſatisfaction; upon which I received a complaiſant letter from Mr. Bowdoin, incloſing farther animadverſions on the ſubject, with a promiſe from the honourable profeſſor to try the experiment in Boſton. Mr. Bowdoin alſo ſignified his deſire that I ſhould write farther on the ſubject, and that it might be printed, at the expenſe of the ſociety, in the firſt volume of their Tranſactions, which was then preparing for the preſs. However, having been worried with the oppoſition I had met with, and being, at that time, in a declining ſtate of health, notwithſtanding I conceived the honourable ſociety to have been erected for the expreſs purpoſe of encouraging arts, ſciences, &c. yet, having found it ſo very difficult and expenſive for me to approach them, I have hitherto neglected it; and have, at this time, preferred an addreſs to the people at large, to whom I would

obſerve, that, ever ſince my aforeſaid publication, I have continued in the practice of phyſic, and in the uſe of calomel, as a febrifuge, in the manner deſcribed, and ſtill believe it to be the moſt expeditious, ſafe, and effectual febrifuge that I ever had the knowledge of; and that it is, in its effects, the greateſt antiputreſcent hitherto known: neither ſhould the phyſician fear to give it on account of its diſſolving the juices, and ſo haſtening the putrefaction of the ſame; for it evidently has no ſuch tendency," &c. &c. &c.

The aſſurances the pamphlet contains of the ſafety of exhibiting calomel in very large doſes, from a phyſician who has practiſed ſo long a time as Mr. Hamilton, are certainly well worthy of attention.

We, however, believe the method of inoculating for the ſmall-pox by abſorption through the cuticle is not much practiſed; we, therefore, inſert the author's experiment in his own words:

"In the year 1785 I impregnated a bit of clean ſponge with the infection of the ſmall-pox; and, as I had before experienced that froſt was abſolute deſtruction to the variolous matter, I carefully kept it from the cold until it was perfectly dry; and then, with ſciſſars, I cut from this ſponge a piece as big as the head of a large braſs pin; and, after having cleanſed with the end of my finger, wet with ſpittle, a ſufficient ſpot of the ſkin on the arm of a child aged ſix months, while aſleep in bed, I put thereon my little bit of ſponge, carefully dropping water from the point of a pin, a ſufficiency to moiſten it a little, and then ſecured the ſponge in its place by a plaiſter of ſimple diachylon as big as an Engliſh ſhilling, and ſecured farther with a bandage. This was done at eight o'clock at night. Early the next morning all was thrown off from the arm, and the arm waſhed in cold water. We could plainly diſcover a red and hard tumor, about the bigneſs of the bit of ſponge which lay over it. This almoſt diſappeared at turns; but on the fifth day from the firſt application this tumor became an handſome pock, together with four more—three on the face and one on the arm—making five in the whole."

The violence of the ſubſequent ſymptoms in this caſe are in no wiſe recommendatory of this manner of inoculating.

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

Pestilence.

OUR ſummer and autumn have not paſſed away without another viſitation of the Yellow Fever in divers parts of the United States. The mildneſs of the ſummer gave hopes of mitigation, if not of immunity; and, happily, theſe have been ſo far realized, that the ravages of this year, in moſt places, have fallen greatly below thoſe of the laſt. In Philadelphia and New-York the diſeaſe began and terminated nearly at the ſame periods. Some caſes were obſerved early in July—in Auguſt the number of them was much increaſed—in September the diſeaſe had attained its greateſt height—and in October it declined ſo faſt as to be nearly extinguiſhed by the firſt of November. In both cities the deſertion of the inhabitants was early and very general, eſpecially in thoſe parts where the diſeaſe began and raged with moſt violence. A great number of thoſe, in particular, who had quitted the town at an advanced period of the epidemic, carried the noxious power with them into the country, and died at their places of refuge. The eaſtern States have chiefly eſcaped this calamity. In Boſton it made a very ſlight and tranſient appearance early in the epidemic ſeaſon. At Hartford (Connecticut) it created a great alarm, and raged for ſome time with a conſiderable mortality; but it was limited to one part of the town—a ſpot of low ground—and, upon the deſertion of this, ceaſed to be propagated. Two of the ſouthern States have been viſited in a more ſerious manner. In North-Carolina, according to our information, the towns of Newbern, Wilmington and Waſhington, have ſuffered in a violent degree. And in Charleſton (S. C.) we learn that the diſeaſe began at an early ſtage of the ſeaſon, and continued, for many weeks, to prevail with great mortality; confining, however, its attacks chiefly to ſtrangers, or ſuch as had recently arrived from the country. We hope to obtain, for a future number,

a more particular account of the appearance of the diſeaſe at theſe places.

For the phenomena of the diſeaſe, as it appeared in New-York, we refer the reader to our account of the epidemic of laſt year. Many ſuppoſe that the malignancy of this epidemic, compared with the preceding, was greatly diminiſhed; and there is no queſtion that the number of ſeizures and of deaths in this city was very far inferior to that of 1798. But in a given number of caſes there is reaſon to doubt whether any abatement of the violence of the diſeaſe, or any diminution of mortality, has actually taken place. For ourſelves, we have no doubt that inſtances, as malignant in their aſpect and as precipitate in their termination as any of the laſt year, have been obſerved in the courſe of the late epidemic.

The recurrence of the Yellow Fever has revived the long conteſted queſtion of *foreign* or *domeſtic* origin. A maſs of teſtimony, however, in proof of domeſtic origin, is now collected from ſo many different and authentic ſources, that we conceive the queſtion will ſoon ceaſe to be agitated, and the warmeſt opponents of that opinion acquieſce in the general conviction. The events of the late ſeaſon have greatly narrowed the controverſy; and many of thoſe who inſiſt upon the importation of the Yellow Fever, when brought to explain the mode of it, are found to have abandoned all ſuch acceptation of the term as we ſuppoſe to lead into error.

The term *importation* is ambiguous and perplexing in its application to diſeaſes. Scarcely an inſtance can be adduced, in all the compaſs of language, where more miſtake has ariſen from the miſunderſtanding and miſapplication of a ſingle word. The mercantile uſe of it is, indeed, well underſtood; and, when employed to expreſs the bringing of articles of merchandize into a country from abroad, in bulk, it ſeems ſcarcely liable to be miſtaken. But a moment's conſideration will ſatisfy us that this ſenſe of the word will not apply to the introduction of the diſeaſe in queſtion. As examples of the ambiguity of this term, in reſpect of the origin of Yellow Fever, we ſhall briefly notice ſome of the various ſenſes in which it has been uſed by different perſons.

1. Is the Yellow Fever imported from the Weſt-Indies by a continued propagation of contagion from one perſon to another in ſucceſſion, or by a lodgment of ſuch contagious matter, originally derived from the bodies of perſons ill of that diſeaſe,

in certain ſubſtances adapted to receive, retain, and afterwards diffuſe it, as in the caſe of ſmall-pox and meaſles? In our opinion this cannot be admitted—becauſe that diſeaſe, according to the beſt authorities, is not contagious in the Weſt-Indies—becauſe it is not pretended to be generally contagious in this country, beyond certain local ranges of air contaminated by other cauſes—becauſe multitudes take the diſeaſe in our cities who never approached the ſick or the veſſels pointed out as the ſource—becauſe multitudes approach the ſick, and perform every requiſite office for them without infection—becauſe the diſeaſe is found to prevail in parts of our country not viſited by perſons from the Weſt-Indies, and inacceſſible to ſea veſſels—becauſe it prevails only in peculiar ſeaſons and ſituations—and becauſe it yields ſpeedily to froſt. It is ſurely wonderful that this *ſpecific contagion* of Yellow Fever contended for, ſo ſubtile as to lurk in the moſt unperceived and unſuſpected places, ſo inextinguiſhable as to reſiſt all the winds and rains of heaven, in the paſſage from the Weſt-Indies, and ſo virulent as ſometimes to cauſe death in a few hours, ſhould yet never produce the prevalence of the diſeaſe in the cities of the United States but juſt at that time when domeſtic miaſmata are exalted by the ſeaſon to the higheſt point of force, and that, preciſely like ſuch miaſmata, it ſhould immediately yield to hard froſt. Theſe circumſtances, as we believe, do not apply to any diſeaſe of ſpecific contagion hitherto known; but they form only a ſmall part of our objections to this mode of importation.

2. Is the Yellow Fever imported into this country by bringing acroſs the ocean a quantity of the peculiar air of the Weſt-Indies, which eſcapes from the holds of veſſels while the cargo is diſcharging at the wharf? This opinion is too abſurd to ſtand in need of refutation. None but an air-tight veſſel could, for ſuch a time, and with ſo much motion, confine a portion of atmoſpherical air received into its hold.

3. Is the Yellow Fever imported by the generation of noxious vapours, ariſing from neglect of cleanlineſs and ventilation, and from the long accumulation of dead animal and vegetable matter, rendered putrid by heat and moiſture, on board the veſſels trading to and from the Weſt-Indies? This mode of importation, if it can with any propriety be called ſo, we believe to be ſometimes a fact. We believe that this diſeaſe is occaſionally taken by receiving the exhalations of ſuch a filthy and putrid ſhip; but we are confident, at the ſame time, that theſe exhalations differ not materially from

ſuch as are emitted from the docks and ſewers, and many other local ſources of putridity which abound in our cities. And we are equally confident that ſuch exhalations from ſhips can never produce an epidemic prevalence of the diſeaſe, without the concurrence and aid of miaſmata from other ſources, for the purpoſe of diffuſing the poiſon. But how is the term *importation* applied to this ſort of noxious power? Is it becauſe it is an accident or contingency which may take place in a ſhip? If a ſhip had never gone to ſea, but had remained at a wharf from the moment of launching, ſhe might ſtill collect a maſs of putrid matters, and thereby become a ſource of diſeaſe. We have no quarrel with the word *importation*, if it be uſed to expreſs this accidental occurrence in ſhips trading to the Weſt-Indies, and if it lead no perſon into error. But we contend that, with the ſame propriety, many other unfortunate accidents occurring at ſea, ſuch as the devaſtation of ſtorms, the damages of cargoes, and the miſeries of famine, might all be denominated *imported* evils.

The advocates of the domeſtic origin of this diſeaſe are often called upon to explain the more frequent occurrence of it within a few years paſt; ſince heat, filth, and putridity, for a long time, and, in ſome inſtances, more remarkably in former times than lately, have characterized the cities of America. But only a moment's reflection will be requiſite to perceive, that the doctrine of importation will by no means relieve this difficulty. As the Yellow Fever has conſtantly, more or leſs, prevailed in the Weſt-Indies, among Europeans and others newly arrived from the higher latitudes, for more than a century paſt, and as our intercourſe with theſe iſlands has been ſubject to little interruption within that period, why has it not been imported, and rendered epidemic every year? In our opinion this difficulty can only be reſolved by aſcribing the malignancy of recent epidemics to a peculiar, though unknown, morbid conſtitution of the atmoſphere; an occurrence which the hiſtory of diſeaſes, (independently of Yellow Fever), in all ages, and in all regions of the globe, is found incontrovertibly to atteſt, and which is obſerved to return and prevail at unequal and indefinite periods.

Of the Nitrous Fumigation.

A book of evidence, on the effect of nitrous vapour in preventing and deſtroying contagion, has been publiſhed

by Mr. Dobſon, in Philadelphia. The principal part of the firſt ninety pages of the work is a republication, with ſome alterations, of pieces contained in the author's work on the Jail-Diſtemper. Our readers will recur to the remarks on the Wincheſter experiment with this gas, and on thoſe made on board the Union hoſpital-ſhip, and in the Ruſſian ſhips, publiſhed in our vol. ii. p. 229, & ſeq. It was there ſtated that the experiments were very inconcluſive: *ventilation, cleanlineſs, better accommodation for the ſick, and a variety of other excellent regulations having been inforced,* and, by a curious kind of logic, the effect of theſe wholeſome precautions being aſcribed ſolely to the nitrous vapour. The body of the volume conſiſts of letters, and extracts of letters, chiefly from ſurgeons in the Britiſh navy, concerning their trials with nitrous vapour in priſons, hoſpitals, and on board of ſhips. The evidence is much of the ſame kind with the former, and in no reſpect more weighty or more to the point. The experimenters ſtill attend ſcrupulouſly to ventilation, cleanlineſs, &c. while their acid fumigations are going on, and then moſt incoherently conclude that the nitrous vapour did all the good. Mr. David Patterſon's long panegyric on this *moſt convenient, moſt elegant, moſt ingenious,* and *moſt efficacious remedy,* as he calls it, contains two or three pages of directions on the utility of *ventilation, changing of wards,* and *cleanlineſs,* practiſed at Forton (p. 108. Phil. edit.) Mr. M'Grigor moved the ſoldiers from an unhealthy to a dry and healthy ſpot (p. 121), and thinned the different rooms of their ſick (p. 123 and 128). Mr. John Griffen ſtates (p. 139), that, *with a due obſervance of cleanlineſs* added to the fumigation, they were enabled to report, after a while, that the jail fever exiſted no longer in the royal hoſpital at Haſlar. Mr. John Snipe teſtifies, that, at Yarmouth, their ſucceſs in ſtopping what he calls a contagious fever, was owing to *cleanlineſs, free ventilation,* and a daily diffuſion of the nitrous gas (p. 149). Captain Lane removed the people from *the ſhip he mentions for a few days, white-waſhed the decks,* and uſed the nitrous fumigation (p. 155). And Mr. R. Cinnamond, and Mr. Robert Sabine, aided the proceſs *by proper attention to cleanlineſs, and by airing between the decks of the ſhip Melampus* (p. 162 and 163). Moſt of the other accounts ſeem mutilated and imperfect. If the relators had mentioned *the whole* of the circumſtances, it is probable that cleanlineſs and

ventilation would have been mentioned in all the trials wherein the fumigation did no harm. What do all theſe experiments prove? Merely this—that the removal of naſtineſs and nuiſances from the perſons, beds, clothing, apartments, and neighbourhood of the ſick, and the admiſſion of a plenty of good reſpirable air, will deſtroy febrile poiſon, *if aſſiſted by nitrous fumigation*—AND SO THEY WILL MOST PERFECTLY WITHOUT IT. This publication is, indeed, full of inſtruction; but the facts it contains require an interpretation very, very different from that which the humane and public-ſpirited author derives from them. It is a remarkable ſpecimen of looſe narrative, and of concluſions not warranted by the premiſes. The way to try the nitrous fumigation fairly is to apply it, and it alone; and this mode we recommend to the advocates of that practice as the only unequivocal means of determining its efficacy. Can any body think it philoſophical and fair, after water, ſoap, lime, ley, and oxygenous air have been freely employed, to aſcribe the good wrought *to the ſalt-petre vapour?*

ADAMANTINE SPAR AND BASALTES.

Dr. Adam Seybert, of Philadelphia, has diſcovered, at Cheſnut-Hill, nine miles from that city, cryſtals of ADAMANTINE SPAR. It is bedded in large maſſes of granite, or rather forms a part of that rock, together with fleſh-coloured feldſpath, ſmoky quartz, greeniſh mica, ſtriated cryſtals of black ſhoerl, and ſometimes ſmall garnets. Its external appearance is very ſimilar to the Bombay ſpecimens; but differs from them in being free from pyrites, and in being much more regularly figured. Its colour is light green, and its hardneſs ſuch as to cut glaſs very readily. Some pieces have the luſtre of glaſs, while others are not ſo bright. In other reſpects the character of it agrees with that given in 1 Kirwan's Mineralogy, p. 335, var. i. From having found other cryſtals of adamantine ſpar among the fragments of granite thrown out by the labourers in digging a reſervoir for water at Philadelphia, the vigilant diſcoverer is led to believe it may be found in many parts of the United States. We are happy to underſtand Dr. Seybert intends to favour the public with a ſet of correct experiments on the compoſition of this curious production of nature.

The ſame gentleman has alſo diſcovered ſome elegant baſaltes, of a very regular form, in a ſituation confirming its

Neptunian origin. It was found in a bed of gravel with breccia, at the upper end of Flour-Town, thirteen miles from Philadelphia.

New Material for the Manufacture of Paper.

Robert R. Livingſton, Preſident of the Agricultural Society, and Chancellor of the State of New-York, has diſcovered a property, in a ſpecies of *conferva* (we believe *conferva rivularis*, Lin.), very plentiful in the water of the Hudſon, to afford excellent paper. From ſamples of paper manufactured from this plant, with an admixture of one ninth of coarſe rags, it ſeems well adapted for wrappings, for hangings, and for book-binders' uſe. As far as can be judged, the cheapneſs and plenty of the material will render this diſcovery very important, by leſſening the price of an article ſo variouſly employed as paper is. It could, doubtleſs, be bleached as well as other paper, either by the common proceſs employed for rags, or by aid of the oxygenated muriatic acid gas; and we have ſeen a ſpecimen in which this has been attempted with conſiderable ſucceſs. The liberal and patriotic inventor will, we hope, purſue the ſubject further.

Chart of Lower-Canada.

There will probably be an addition, ere long, to the ſtock of American Geography. We underſtand that Meſſrs. Vondenvelden and Charland, of the province of Lower Canada, have iſſued propoſals for publiſhing, by ſubſcription, a map, in three ſheets, and a topography, in an octavo volume, of Lower-Canada, including, as well the grants made by the French crown, as the townſhips ſurveyed and laid out by the Britiſh government. In compiling this work, the publiſhers, beſides their own ſurveys, have availed themſelves of the labours of Meſſrs. Gale and Duberger, for the materials from the ſouth-weſtern boundary of the province down to the counties of Quebec and Dorcheſter. It is to be expected, that a work which promiſes ſuch a valuable addition to the topography and hiſtory of America will meet with due encouragement from the public.

Medical Advice from Marseilles.

Timothy Pickering, Secretary of State to the American government, informs Dr. Mitchill, in his letter of October 14,

1799, that he has received from Mr. Cathalan, the conſul of the United States at Marſeilles, ſeveral copies of a pamphlet, compiled there, on the ſubject of the Yellow Fever of America. This collection of pieces was undertaken by Mr. C. in conſequence of a requeſt by the Secretary of State to be informed concerning the inſtitution of the famous lazaretto of Marſeilles. From peruſing a copy of the Conſul's publication, which was politely forwarded to us by the Secretary, we learn very little about the object of Mr. P.'s inquiry; but, on the contrary, we find an opinion of the board of health at Marſeilles, another of ſeveral phyſicians of the ſame place, and a third of a number of medical men at Montpellier, delivered in a very formal manner, on the prevention and cure of the Yellow Fever of America, and on the method of deſtroying its contagion! They are apprehenſive it may be imported at ſome future day from New-York and Philadelphia into the ports of the Mediterranean.

The conſultation of Montpellier is ſubſcribed by Tandon, Fouquet, Chreſtien, and Fagès. Among other preventative means, they recommend to the people of the United States *to eat as little ſalted proviſion as poſſible, to drink tea ſparingly, to diſcontinue entirely the uſe of coffee*, and *to eat no butter nor fat fiſh, ſuch as ſturgeon*. Their curative directions ſeem generally judicious, though mercury is omitted in their liſt of remedies—conſiſting of moderate emetics, cathartics, and ſudorifics, with occaſional blood-letting, freſh air, cleanlineſs, and a light vegetable diet. Our readers will ſmile to learn that they propoſe to deſtroy the contagion *by the burning of caſcarilla and ſpruce* (they perhaps mean *pine) wood*, and to prevent the operation of it *by the ſmoking of tobacco* and *the application of cauteries*. They further adviſe, for the ſame purpoſe, the burning of *aromatic woods* in the ſtreets during the day, and particularly at evening, and the conſtruction *of barracks for the ſick of pine (ſpruce) timber*. The phyſicians Moulard, Joyeuſe, Vidal, and Bouge, of Marſeilles, adviſe temperance, moderate diet, an open belly, chamber-bathing, riding on horſeback, abſtaining from pork, &c. as means of prevention; aceſcents, laxatives, emetics, antiſpaſmodics, antiſeptics, with cupping, blood-letting, and bliſters, according to circumſtances, as means of cure, and refer to the regulations of their lazaretto for information as to the method of ſtopping the contagion, which they ſeem to think are effectual there, and, of courſe,

muſt be infallible in all other places. Though this pamphlet contains little either to amuſe or inſtruct the American phyſician or legiſlator, we have thought it worth the while to give this abſtract of it in juſtice to Mr. Cathalan, of whom the Secretary of State writes in theſe honourable terms: "I am ſure his zeal has been thus diſplayed with the beſt intentions; for he has given uniform proofs of benevolence, and of attention to the intereſts of the United States."

Bread-fruit Tree.

A flouriſhing young bread-fruit tree was, in Auguſt laſt, preſented to Mr. John Wood, of the city of New-York. It was brought from the Iſland of Jamaica by Captain Stephen Clay. Though the rigour of our winters may prevent the growth of this and ſome other plants of the South-Sea Iſlands in the open air, yet they are juſtly eſteemed a valuable acquiſition to the collection of green-houſe plants.

Liberal Decree *of the* Trustees *of* Columbia College, *in reſpect to* Chemistry.

Notwithſtanding it has been ſo long known that natural philoſophy, or the ſcience of *experimental phyſics*, is divided into two great branches, the *mechanical* and the *chemical*, ſtill the *former*, which only treats of the more obvious and ſenſible properties of matter, has been taught in colleges and univerſities. The *latter*, which is employed in aſcertaining the laws which govern the compoſition and decompoſition of material bodies, and ſcrutinizing more nearly the relations and affinities of their component atoms, has rarely or never entered the plan of what is termed a genteel or liberal education; but has been improperly conſidered as auxiliary only to the medical profeſſion. The truſtees of Columbia College have wiſely corrected this error, by determining, at one of their late meetings, that the ſtudy of the *chemical branch of phyſics* ſhould precede the conferring of the degree of Bachelor of Arts upon the ſtudents of that ſeminary: of courſe, the youth educated there will have the advantage of becoming acquainted not only with natural philoſophy, as it is commonly termed, but with chemiſtry. This is an example highly worthy the imitation of other places of public inſtruction.

Additional Experiments, by Dr. RICKETSON, *on the Cultivation of the* POPPY-PLANT, *and the Method of procuring Opium.* (See vol. i. No. 4. p. 420. Appendix).

The intent of the preſent remarks is to illuſtrate my former experiments, and to decide ſome points I then delivered with ambiguity.

In my eſſay, or former experiments, I ſaid—"From the trials I have made, I am of the opinion, that it is a matter of indifference which ſpecies or variety of the plant is cultivated for medicinal uſe, as they all afford, when tapped, a juice that is ſimilar, as to quantity, colour, and every other reſpect, both freſh and when dried: however, I have thought that the large double ſpecies produces the greateſt number of heads, and, conſequently, the largeſt quantity of juice from one ſeed; but of this I have not yet had ſufficient trials to be certain."

In confirmation of which, I yet think that the juice of every kind of the plant yields the ſame opium: but I have lately found one ſpecies or variety of the plant that claims particular attention, and a ſuperiority to all others I have ever ſeen. This is of the ſingle ſpecies, and of the variety of large red or purple flowers. It grows larger and more luxuriant than any other I ever ſaw, that is, from four to five feet in height. It generally produces from two to four ſtalks or heads from one ſeed. The capſules, or heads, grow particularly large, as do alſo the ſtalks: and I muſt here remark, and it is ſufficiently obvious, that it is the two laſt particulars wherein the ſuperiority of this variety of the plant conſiſts.

I have thought that this was longer in arriving to maturity than the common kinds: and as it rarely or never has more than four ſtalks, the ſeeds may be planted as near as ſix or eight inches diſtance.

In my eſſay I ſaid—"The ſtates of the plants, wherein I have found them to yield moſt juice, are juſt before, in the time of, and immediately after flowering."

I now find that they yield moſt plentifully a few days after the flowers have fallen: and if it be collected from the heads in the Aſiatic manner, not until eight, ten, or twelve days after, which will be further known by the heads (particularly the large kind above-mentioned) turning to a red or purple colour; when they will be found to have nearly acquired their full ſize, and to yield moſt plentifully a thick, rich, milky juice.

Agreeable to the result of my former trials, I said—"I have tried the Asiatic method, with several others; but none have ever succeeded so well with me as, in a sunshining day, to cut off the stalks at about an inch distance from their flowers, or capsules, and, as soon as the juice appears, which it does, at first, equally well on that part of the stalk cut off with the capsule, or flower, as on the standing part, to collect it with a small scoop or penknife, the last of which I have found to answer the purpose very well. After the juice ceases to appear on the top of the standing stalk, it should be cut off about an inch lower, when it will be found to yield almost as freely as before, and repeated as long as any juice appears."

Since which, as it had been suggested that the method I recommended was not equal to the Asiatic, I made a number of experiments, to determine the matter with greater certainty: but what is necessary to add, and which is sufficient for the present purpose, is, that in every experiment, made under equal circumstances, I obtained the largest quantity in the former way, that is, by cutting the stalk, though it may require rather more care and labour.

I might have remarked, in my former directions, that the juice will harden sufficiently by standing in the open air; but as this is slow and tedious, the sun's heat may be always employed.

With respect to the comparative strength of the Asiatic and American opium, all the trials I have since made, as well as those of my friends, lead to the same conclusion as in my former essay.

CHEMICAL NEWS; *communicated in a Letter to* SAMUEL L. MITCHILL, *M. D. Professor of Chemistry in Columbia College, New-York, by* JAMES WOODHOUSE, *M. D. Professor of Chemistry in the University of Pennsylvania, &c. dated Philadelphia, August* 22, 1799.

FIRST.

Of the non-Action of the Nitric Acid on Silver, Copper and Tin.

Having occasion to make a solution of silver in the nitric acid, several thin pieces of silver were digested forty-eight

hours, in a ſmall quantity of the moſt pure and concentrated acid, prepared by diſtilling ſtrong ſulphuric acid on nitre, from which the water of chryſtallization had been thrown off by means of heat, and the metal was not diſſolved. The temperature of the air varied between 75 and 90 degrees of Fahrenheit's thermometer.

This phenomenon was contrary to what ought to have taken place, according to the chemiſts of all nations, who declare that the nitric acid diſſolves ſilver with the utmoſt rapidity.

Suppoſing that the non-action of the acid was owing to the metal being in ſmall maſſes, the filings of ſilver were tried, but no ſolution took place in the ſpace of two days. Having then added a ſmall quantity of water to the acid, the ſilver was diſſolved in a few minutes.

Repeating this experiment upon copper, the ſame effect happened.

Nitric acid was poured upon copper, and no action was produced; but, upon the addition of water, ſolution immediately commenced, and oxygenous and nitrous air was diſcharged; the latter holding a portion of the copper in ſolution, as appeared by immerſing a lighted taper in the nitrous acid gas, when it burned with an enlarged vivid and blue flame. The flame of the taper was frequently blown out, and rekindled by dipping it into the air.

Some concentrated nitric acid was alſo poured upon tin foil, when it remained in a quieſcent ſtate for the ſpace of one week; but, upon the addition of water, the whole was inſtantaneouſly converted into a white oxyd, with the production of a high degree of heat.

The errors of chemiſts, in regard to the action of nitric acid upon tin, will be ſeen more clearly by extracting what has been ſaid upon the ſubject.

Chaptal tells us the nitric acid devours tin, that the decompoſition is ſpeedy, and that the metal is inſtantly precipitated in the form of a white oxyd. The ſame author ſays, Mr. Baumé even pretends that the nitric acid does not diſſolve tin; but Kunckel and the famous Rouelle have maintained the contrary.

Fourcroy declares that tin decompoſes nitric acid, even in the cold, with amazing rapidity, and that this is one of the moſt aſtoniſhingly rapid ſolutions in all chemiſtry.

From what has been ſaid, it appears that Mr. Baumé is

right, and that Fourcroy, Chaptal, Rouelle, and Kunckel, uſed an acid diluted with water.

In what manner does water act in theſe experiments?

Dr. Prieſtley ſuppoſes that no air can be produced without water, and that it is neceſſary to the conſtitution of every kind of air; but this throws little light upon the ſubject, and it does not account for the manner in which water acts in promoting the ſolution of ſilver, copper, and tin, in the nitric acid; and nitrous air may be obtained from zinc and biſmuth by the acid, however concentrated.

It may be ſuppoſed, that the water merely produces heat by uniting with the acid, and ſo diſſolves the metals; but this is not the caſe; for if the acid is diluted with water, and ſtands until it is cool, it will ſpeedily diſſolve them.

It is a common thing with the teachers of chemiſtry to fold up a portion of the dry nitrate of copper in tin foil, and to let it remain, for ſome time, in contact with the tin, to ſhow that it will not act upon the metal in a dry ſtate. The tin foil is then unfolded, and a little water is added to the nitrate of copper, and it is again encloſed in the tin, when a violent action enſues, accompanied with ſparks of fire, and a diſcharge of nitrous air.

The intention of this experiment is to ſhow that bodies do not act upon each other in a dry ſtate—*corpora non agunt niſi ſoluta.* But from the experiments which have been related, of the non-action of the nitric acid on tin, the explanation of what takes place muſt be ſought for in the action of the water on the nitric acid of the nitrate of copper.

Some writers have taken notice of the production of ammoniac, when nitrous acid is added to copper and tin. As the concentrated acid has no action on theſe metals, the ammoniac muſt be produced by the hydrogen of the water uniting with the azote of the nitric acid, while its oxygen, and that of the water, unites to the tin and copper, and converts them into oxyds.

Having related theſe facts, the language of chemiſts, in future, ought to be—The nitric acid has no action on ſilver, copper, and tin; but if water be added to the acid, ſolution ſpeedily takes place.

Dr. Hope has taken notice of the non-action of the nitric acid on ſtrontian earth; and Mr. Leonhardi tells us, that it quickly deſtroys wool and ſilk, but that linen may remain immerſed in a bottle of the ſtrong acid a whole day without injury.

SECONDLY.

Of the Difference in the Quantity of Ammoniac obtained from Bones, by diſtilling with and without a Lute.

A quantity of the bones of horſes and cows were placed in a diſtilling apparatus, formed of iron, which communicated with the worm of a refrigeratory, to which a large glaſs receiver was annexed. Upon applying a high degree of heat, three ounces of volatile alkaline ſpirit, impregnated with the black animal oil of Dippel, were obtained in three hours. The receiver was cloſely luted to the worm, and the air in it was perfectly tranſparent. Upon taking away a part of the lute, in ſuch a manner as to permit the air of the atmoſphere to enter the receiver, it became immediately filled with a thick brown yellow cloud of ſmoke.

Having made a variety of comparative experiments, to determine the difference in the quantity of the product, by diſtilling with and without the lute, it was found that five times as much of the volatile alkaline ſpirit could be obtained by carrying on the diſtillation without the lute, as could be procured, in the ſame ſpace of time, with the application of the lute.

Lavoiſier ſuppoſes, that when ammoniac is obtained from animal ſubſtances, the hydrogen and the azote of theſe bodies unite together, and form the volatile alkali; but it appears, from what has been ſaid, that the azotic air of the atmoſphere enters into the worm of the refrigeratory, joins the hydrogen of the bones, and ſo forms the ammoniac.

Manufacturers of the volatile ſpirit of ſal ammoniac may take ſome valuable hints from theſe experiments.

THIRDLY.

Of putrid Urine expoſed to the Froſt.

A quart of the moſt putrid urine, and of as yellow a colour as gamboge, was expoſed, two nights, to intenſe cold, when it became perfectly ſweet, and was as colourleſs as rock-water.

May not this wonderful change be attributed to the agency of the oxygen gas of the cold atmoſpheric air?

The acid of citrons not only neutralizes the volatile alkali of putrid ſubſtances, but completely deſtroys the nauſeous ſmell which exiſts, independent of the ammoniac. The ſulphuric and muriatic acids have no ſuch effect. Does the

oxygen of the citric acid act here likewise? Lowitz, a Ruſſian chemiſt, ſuppoſes that charcoal neutralizes the putrid effluvia of animal bodies; but, in my opinion, it acts mechanically, in preventing the putrid particles of matter from flying into the air.

FOURTHLY.

Of Starch prepared from the Fruit of the Æſculus Pavia, or Horſe Cheſnut.

In the 29th number of the Repertory of Arts, there is an account of a patent, obtained by Lord William Murray, for making ſtarch from the fruit of the æſculus hippocaſtanum. A writer in the London Monthly Magazine for 1798, ſays he has repeatedly, and in various ways, endeavoured to make ſtarch of the fruit, but always unſucceſsfully; for it turns to a yellow colour.

The fruit of our æſculus pavia is much larger than that of the æſculus hippocaſtanum, and is of a white colour: that of the hippocaſtanum is yellow.

A ſingle nut, dried, weighed half an ounce and twenty-five grains, and yielded forty-four grains of fine ſtarch.

I prepared half a pound of this ſtarch from the nuts of the æſculus pavia, and have kept it two years, and the white colour is no way impaired. It is ſuperior to the fineſt Poland ſtarch, and has been uſed, by ſeveral ladies, to ſtarch various articles of dreſs, without imparting any yellow colour to them.

The method of preparing it is, to take off the ſhells from the nuts with a knife; grate them in a veſſel of water which will hold the fine particles of the ſtarch ſuſpended, when they are to be decanted into another veſſel, which muſt remain at reſt until the ſtarch ſubſides to the bottom. The water is then to be poured off, and freſh is to be added, and the ſtarch is to be well ſtirred about in it, when it muſt be again permitted to ſubſide. The water is then to be thrown away, and the ſtarch is to be dried in the ſun.

The water of the firſt waſhing holds a poiſonous matter in ſolution, which, when evaporated to the conſiſtence of an extract, and mixed with dough, will intoxicate and ſwell the bellies of ſmall fiſhes.

FIFTHLY.

Of the Compoſition of Flores Martiales and Ens Veneris.

The French chemiſts ſay that the flores martiales are com-

poſed of ſal ammoniac, coloured by an oxyd of iron, and that ens veneris is ſal ammoniac, coloured by an oxyd of copper; but I can eaſily prove that the one conſiſts of ſal ammoniac and the muriate of iron, and the other of ſal ammoniac and the muriate of copper.

1ſt. When iron or copper is added to ſal ammoniac, the ſalt is decompoſed, the iron or copper unites to the muriatic acid, and forms a muriate of iron or copper, which, when expoſed to heat in cloſe veſſels, ſublimes with the ſal ammoniac, while the volatile alkali is ſet at liberty.

2dly. Flores martiales, or ens veneris, may be made by ſubliming ſal ammoniac with the muriate of iron or copper, prepared by adding the muriatic acid to theſe metals.

3dly. When flores martiales, or ens veneris, are diſſolved in water, and ſuffered to chryſtallize, the muriate of iron and copper will be obtained ſeparate from the ſal ammoniac.

SIXTHLY.

Of Aromatic Oils, obtained from the Pellicle which envelopes the Seeds of the Laurus Saſſafras and Laurus Benzoin.

The method of obtaining theſe oils is to boil the pellicle which ſurrounds the ſeeds of the ſaſſafras and Benjamin-tree in water, when they float upon its ſurface, from which they may be ſkimmed with a ſpoon.

That of the ſaſſafras differs materially from the oil obtained from the bark of the root of this tree. Its aroma is different; it is much lighter, and it congeals in a higher degree of heat.

The oil of the benzoin-tree is a delightful aromatic, is very inflammable, and might be uſed as a ſpice in food, and in all thoſe diſeaſes in which the aromatic oils are uſeful. It has been tried with ſucceſs, as an external application, in a ſevere caſe of chronic rheumatiſm. One half pound of the pellicle of the ſeeds will yield ſeveral ounce meaſures of oil.

SEVENTHLY.

Of the Eudiometer.

The eudiometer is an uſeleſs inſtrument in aſcertaining the purity of atmoſpheric air.

1ſt. Becauſe nitrous air can never be obtained of the ſame degree of ſtrength.

2dly. When one meaſure of nitrous air is added to one meaſure of atmoſpheric air, the abſorption will be great or ſmall, according to the time the air remains over the water, or is agitated in it.

Having made ſeven trials with this inſtrument, with the ſame atmoſpheric air, I obtained a diminution, at the firſt experiment, of

	0	60
2d,	0	56
3d,	0	95
4th,	0	87
5th,	0	90
6th,	0	93
7th,	0	100

From this it is evident, that Dr. Davidſon was deceived in ſuppoſing that the air of Martinique was much purer than the air of Europe, and that the error lay in his inſtrument. The nitrous air which I uſed was procured from nitric acid diluted with water and copper.

Eightly.

Of American Bliſtering Flies.

I have diſcovered two other bliſtering meloes beſides that deſcribed in the Medical Repoſitory. The one I would call MELOE CLEMATIDIS, as it is particularly fond of ſeveral ſpecies of this plant. It is larger than the one deſcribed by Dr. Chapman, and the female is nearly twice the ſize of the male. The head, thorax, elytra, and antennæ, are black; the elytra only edged with white. The abdomen is of a light aſh-colour. The upper part of the abdomen, under the wings, is marked by two longitudinal ſtreaks of a bright clay-colour. The *aſters* are ſometimes black with theſe flies, and the leaves are entirely deſtroyed by them.

The other I would call *meloe nigra*, the *Pennſylvanica* of Linnæus. It is not more than half the ſize of Chapman's fly. The whole of it is black. It feeds upon the prunella vulgaris, or ſelf-heal, and ambroſia trifida, or ſtick weed.

I applied a ſmall bliſter of theſe flies to my ſkin, and loſt the plaiſter in half an hour. In twelve hours after a fine bliſter was produced. A watery extract of the flies bliſtered in ſix hours. Diſtilled in a retort, they yield an acid, whoſe properties have not yet been examined.

Beſides theſe three kinds of meloe, there is another found in this country, mentioned by Kalm, and called by Linnæus *meloe majalis*; but it is not yet known whether it will bliſter; for Shoepf expreſſly aſks the queſtion, "An mel. veſicatorio (cantharid. officinal.) ſubſtituendus?"

We then know for certainty of three kinds of indigenous bliſtering flies—meloe Chapmani, meloe clematidis, and meloe nigra. Meloe majalis, doubtful.

NINTHLY.

Of the Baſe of the Muriatic Acid.

Mr. William Lambe, in an eſſay in the fifth volume of the Mancheſter Memoirs, has attempted to prove that ſulphurated hydrogen is the baſe of the muriatic acid. He obtained ox. muriatic gas by dropping ſulphuric acid upon the reſiduum left after evaporating water which had been impregnated with hepatic gas, in which iron and manganeſe had been digeſted. I have performed this experiment, and the reſult is exactly as ſtated by Mr. Lambe.

Two drachms of the filings of bar-iron were placed in twenty-two ounce meaſures of diſtilled water, which had been impregnated with ſulphurated hydrogen gas, in Nooth's apparatus. In five days twelve ounce meaſures of inflammable air eſcaped from the water. Six ounces of the clear fluid evaporated to dryneſs, left a reſiduum, conſiſting of dephlogiſticated muriate of iron, which attracted the moiſture of the atmoſphere. A few drops of ſulphuric acid, let fall upon it, produced an effervescence, and white clouds of ox. muriatic gas eſcaped, as was very evident from the ſmell, and from the teſts generally uſed to detect the preſence of this gas.

The diſcovery of Mr. Lambe is the beſt which has been made for many years.

A number of literary gentlemen in Connecticut, have lately aſſociated for the purpoſe of encouraging philoſophical reſearches, and, particularly, for developing the natural hiſtory of that State. The aſſociation has aſſumed the title of *The Connecticut Academy of Arts and Sciences.* The general meeting of the Academy, for the election of officers, is to be held, annually, at New-Haven, on the fourth Tueſday of October; and the other meetings are to be on the fourth Tueſdays of December, February, April, June, and Auguſt, at New-Haven.

The following are the officers elected for the present year:
Rev. Timothy Dwight, D. D. President.
His Excel. Gov. Trumbull, Vice-President.
Hon. John Treadwell,
Rev. James Dana, D. D.
Dr. Eneas Munson,
Rev. Bela Hubbard,
Hon. Chauncey Goodrich, } Counsellors.
Simeon Baldwin, Esq. Recording Corresponding Secretary.
Noah Webster, jun.
John C. Smith,
Enoch Perkins, } Corresponding Secretaries.
Josiah Meigs, Cabinet-Keeper and Librarian.
Isaac Beers, Treasurer.

In the account of the last medical commencement in the University of Pennsylvania, the name of John S. Bellinger, one of the gentlemen admitted to the degree of Doctor of Medicine, was accidentally omitted. His Inaugural Dissertation was on the subject of chronic pneumony, or pulmonary consumption.

We are authorized to mention, that the second part of Dr. Barton's "Fragments of the Natural History of Pennsylvania," will contain a pretty full account of the quadrupeds of that State; and that he expects to publish it next spring.

Mr. Webster's "History of Pestilential Diseases" is printed off, and will be ready for publication in a few days.

We have just received from London the five first numbers of the "Medical and Physical Journal," from March to July, 1799, inclusive, conducted by T. Bradley, M. D. and A. F. M. Willich, M. D. This work comprizes a copious and valuable mass of medical intelligence, obtained from every quarter of the civilized world. We are very sorry that our limits do not, at present, allow us to make extracts from it; but several important ones will be found in our future numbers.

FOREIGN.

We are happy to announce the Intelligence of a more ſucceſsful Method of treating Pulmonary Conſumption, extracted from an intereſting Work of Dr. Beddoes, lately publiſhed, and juſt come to hand.

"HAPPILY, the ſucceſſive endeavours of Engliſh phyſicians promiſe a brilliant æra for humanity. An effectual remedy for conſumption appears to have been nearly aſcertained; and on reverting to the hiſtory of the moſt brilliant diſcovery in phyſiology, and this, the moſt uſeful diſcovery in medicine, it will appear ſingular that they ſhould have been approached by the ſame gradual ſteps. The predeceſſors of Harvey were acquainted with ſuch proofs of the circulation of the blood, that it is aſtoniſhing they did not combine them ſo as to leave no doubt in their own minds, or in the minds of others. In like manner there exiſted, before the two phyſicians who have taught its ſafe, eaſy, and effectual employment, ſuch proofs of the antiphthiſical powers of the FOX-GLOVE, that one muſt wonder its uſe had not, a number of years ago, become general.

"It is probable that certain beneficial effects of this plant, having been accidentally diſcovered, were made known, for a long time, only by oral communication. Gerard and Parkinſon, old botanical writers, mention it as an expectorant; and Dr. Withering has printed, from *Parkinſon's Herbal*, the manuſcript note of a country ſurgeon, affirming its efficacy in conſumption. In the *Family Dictionary* of Salmon, it is ſaid, upon the faith of long experience, perfectly to cure "a phthiſis or ulcer of the lungs, when all other medicines have failed, and the ſick are eſteemed paſt cure."

"Notwithſtanding the temptation which ſuch an encomium held out in ſo calamitous a diſorder, the difficulty experienced in managing the medicine, and its violent effects, occaſioned it to be abandoned, at leaſt, by the regular practitioner, till, from its efficacy in ſtimulating the languid abſorbents of the dropſical, Dr. Darwin inferred its poſſible uſe in pulmonary ulcers; and corroborated his inference by that medical miracle —a cure of confirmed conſumption—evidently wrought by this plant (Medical Tranſactions, 1785, iii. 276).

"The facts related by Dr. Darwin, and others, publiſhed by

Dr. Withering about the ſame period, ſo far overcame the apprehenſions of a large portion of the faculty, as to induce them to preſcribe fox-glove in dropſy. As the period neceſſary for its exhibition in dropſy is but ſhort, its violent effects appeared leſs intolerable. But there could be no hope of healing ulcers of the lungs in a ſhort time; and the uſe of ſo formidable a remedy in conſumption ſeemed either to be rejected by the common feelings of patient and phyſician, or elſe it was adminiſtered with a degree of timidity which could not fail to deprive it of its efficacy. In ſpitting of blood, however, and incipient conſumption, it was occaſionally ventured upon, and, as Dr. Ferriar, and, I believe, others report, with ſucceſs.

"In this ſituation the uſe of fox-glove in conſumption remained; and the ſick were left without relief, and without hope, till Dr. Drake, and Dr. Richard Fowler, led by an enlightened view of cauſe and effect, ſeem to have diſcovered what had long been the univerſal wiſh, but hardly, perhaps, the expectation of any. Dr. Drake propoſed to himſelf two objects. He hoped that the fox-glove, by promoting abſorption, would prevent that hurtful change in the ulcerous diſcharge, which he, in common with Dr. Darwin, ſuppoſes to be produced by the contact of air. At the ſame time, by powerfully retarding the action of the arterial ſyſtem, the ſecretion of matter might be diminiſhed or ſuſpended. He doubted, indeed, whether he ſhould be able, by the cautious and continued uſe of fox-glove, to render theſe conſequences ſufficiently permanent to promote a cure. He had the ſatisfaction, however, to find, in two inſtances, which he has related at large, that the pulſe could be lowered to forty ſtrokes in a minute, and the depreſſion continued till a complete and permanent cure was effected.

"Dr. Fowler's attention was directed to the fox-glove, as a remedy likely to be uſeful in phthiſis, by its almoſt uniform effect in rendering the action of the arteries more ſlow than natural, at the ſame time that it ſeems to excite the abſorbents. Diſeaſed parts of the body may be removed by depriving them of *all* ſupply of blood, and even by diminiſhing, to a certain degree, the arterial ſupply, while the abſorbents are left to act in full force. My friend hoped that this might be effected by the operation of fox-glove on tubercles in the ſubſtance of the lungs: and, proceeding upon this idea, he has been ſucceſsful in many caſes of confirmed conſumption, in

ſome of which the patients ſeemed not to have many days to live. *(Weſt-Country Contributions, Longman).* In his letters to the author, many months ago, he expreſſed the fulleſt confidence that this treatment would generally ſucceed. Both theſe phyſicians thought and acted independently of one another. In caſes of pulmonary diſeaſe, where the exiſtence of tubercles was indicated by every ſymptom, and where they ſeemed ready to break out into open ulcers, I have fully verified their obſervations; and I daily ſee many patients, in pulmonary conſumption, advancing towards recovery with ſo firm a pace, that, I hope, conſumption will, henceforward, as regularly be cured by the fox-glove, as ague by peruvian bark. Could we obtain a ſingle auxiliary for fox-glove, ſuch as we have, in many ſubſtances, for the bark, I ſhould expect that not one caſe in five would terminate as ninety-nine in an hundred have hitherto terminated. But I believe a majority of caſes will yield to ſimple fox-glove. It is evident, that no new caſes need be ſuffered to advance beyond the firſt ſtage without the application of this medicine, and few into it.

"I mean not to conceal that the fox-glove is a dangerous, which means only that it is a powerful, medicine. I ſay nothing of the manner in which it ſhould be adminiſtered; becauſe no perſon unpracticed in phyſic ſhould attempt to adminiſter it. I hope, however, that every reader of this treatiſe will inſiſt that it ſhall cautiouſly and perſeveringly be adminiſtered to his conſumptive friends. All other methods are comparatively frivolous: Moſt methods abſolutely ſo. And I know, from experience, that the fox-glove may be given, with ſafety, to hectic, and, probably, conſumptive infants, a few months old."

[*Beddoes' Eſſay on the Cauſes, early Signs, and Prevention of Pulmonary Conſumption.*

As it may gratify ſome of our readers to ſtate more particularly the manner of uſing the *fox-glove* in this diſeaſe, we think proper to add the following:—Dr. Drake preferred the *ſaturated tincture* of digitalis, of which, at the commencement of its uſe, he ordered, in one caſe, only fifteen drops, twice a day—in another twenty: in the former the doſe was gradually increaſed to one hundred drops, in the latter to ninety-ſix, with perfect ſafety. During this employment of the remedy, all the ſymptoms of irritation and fever, cough, pain, and dyſpnœa, daily grew better, and at length altogether re-

tired.—The formula prescribed by Dr. Fowler is the following: ℞ Fol. Digitalis Purpureæ recent. unc. ii. coque ex. aq. puræ ℔j ad colaturæ unc. vij ſs. & adde Tinct. Cardamom. unc. ſs. Of this decoction, Dr. Fowler generally directed half an ounce to be taken twice, thrice, and, in a few instances, four times in twenty-four hours.

[*Contributions to Medical and Physical Knowledge, collected by* Thomas Beddoes, *M. D.*

Midwifery.

In our second volume, p. 111, we announced a discovery, said to have been made by Mr. Herholdt, an eminent accoucheur at Copenhagen, that the apparent death of new-born children arose from the trachea being filled with a liquid, and that they might often be restored by merely giving them a position favourable to its efflux. We then expressed a doubt as to the correctness of the observations; because it appeared impossible, from Dr. Goodwyn's experiments, that water could, in any case, enter into the trachea; and because, in those experiments in which it had been forced into the trachea, it had always been absorbed, if the animal was suffered to live. Candour, however, now calls upon us to state, that we find the following article in the Journal de Physique for Floreal, an. VII. [*Philos. Mag.*

"An important discovery is announced in the Medico-chirurgical Journal, published by Professor Tode, of Copenhagen. Herholdt has found, on opening the bodies of still-born animals, that the cavity of the tympanum was filled with the liquor of the amnios, and with phlegm (viscous water). This fluid, after birth, issues by the auditory conduit, and is replaced by atmospheric air. This discovery induced him to suppose that the liquor of the amnios is introduced also into the canal of respiration before the child is born. *Experiments made at the veterinary school have confirmed this hypothesis.* Nature, in general, discharges this liquor; but sometimes it is necessary, for that purpose, to employ the assistance of art. A child cannot breathe easily until it is freed from it. Herholdt is of opinion, that this accident occasions more apparent deaths than is commonly believed. It is not sufficient then to rinse the child's throat: it must be placed in such an attitude as will facilitate the running off of the water. The author has had the good fortune, this year, to restore to life twelve chil-

dren out of thirteen who were in the like ſituation. Profeſſors Abildgaard and Wiborg have confirmed this experiment by opening five puppies cut from the belly of the mother."

Gren's Eudiometer.

Profeſſor Gren, in a work of his, lately publiſhed, propoſes the following method of conſtructing an eudiometer by means of phoſphorus; which, though ſlow in its operation, will give a very accurate reſult. Take a ſmall cylindric glaſs tube, ſealed at the one end, and divided from that end, by means of a ſcale, into ſufficiently ſmall equal parts; fill it with diſtilled water, plunge it into a baſon of the ſame liquid, make to aſcend a quantity of the air to be examined, and note the ſtate of the atmoſphere at the time, as indicated by the barometer and thermometer. Through a cork, ſmaller in diameter than the tube, ſtick a few needles, and place on the upper end of them a bit of pure clear phoſphorus: faſten a thread to the bottom of the cork. Introduce this cork into the lower end of the tube, with the phoſphorus uppermoſt, in which it will riſe to the ſurface of the water; ſo that the phoſphorus on the needles will come in contact with the gas in the upper end of the tube. The tube muſt now be left inverted in the veſſel filled with water, in which it muſt remain. The phoſphorus will undergo a ſlow and gradual combuſtion: by means of the thread, the cork, from time to time, may be drawn under the water to waſh off the acid produced by the combuſtion, and, adhering to the phoſphorus, to haſten the proceſs. When all the oxygen gas is conſumed, and the remaining phoſphorus is no longer obſerved to ſhine in the dark, the cork muſt be drawn out; and the obſerver muſt note, at a correſponding height of the barometer and degree of heat with that of the atmoſphere when the proceſs commenced, the quantity of azot remaining, and how much oxygen has been conſumed. [*Philoſ. Mag.*

ERRATA.

In page 140 of this number, line 6 from the bottom, for "wholly" read *very*. Line 5 from the bottom, for "aſſertions" read *aſſertion*.

P. 184, line 17 from the bottom, for "cheurinks" read *chewinks*.

MEDICAL REPOSITORY.

VOL. III.—No. III.

ARTICLE I.

A SKETCH *of the* HISTORY *of the* DISEASES *of the* STATE *of* DELAWARE: *Communicated in a Letter from Dr.* JOHN VAUGHAN, *of Wilmington, to Dr.* MILLER.

No. I.

Dear Sir,

IN compliance with my promiſe, together with a deſire of contributing to the valuable ſtock of information ſo faſt accumulating, and ſo judiciouſly recording in the Medical Repoſitory, I herewith tranſmit you No. I. of *a hiſtory of the diſeaſes of Delaware.* From the ſmall extent of territory, and the uniformity of ſoil and climate of this State, I preſume that a geographical medical hiſtory is not only unneceſſary, but unimportant; except an upper point of the State, between Chriſtiana and Naaman's Creeks, including the town of Wilmington, and a diſtrict of territory, of from 60 to 80 ſquare miles, which partakes of the ſoil and ſalubrity of Pennſylvania. My late reſidence being contiguous to that ſenny tract of country ſo long known by the name of the Welch-Tract Swamps, furniſhed me with a favourable opportunity of obſerving thoſe forms of fever for which our State has become proverbial. And having kept a minute meteorological diary, I ſhall conclude with ſome general obſervations on the morbid influence of the ſenſible qualities of the atmoſphere on the ſub-oxygenated ſyſtems of the inhabitants of ſwamps.

As our ſpring diſeaſes are influenced by the fevers of the preceding autumn, it will, perhaps, be moſt ſatisfactory and methodical to commence with the diſeaſes of ſummer, and end with thoſe of ſpring.

The months of May and June may be denominated our interregnum, or, *e converſo*, the limited reign of the tranſient Hygeia, as the reſt of the year ſhe is either buried in the marſhes or obſcured by the fogs.

July generally aſſumes a different aſpect; and, towards the middle, becomes of a greyiſh complexion. Eruptive and inteſtinal diſeaſes uſually occur, with ſporadic caſes of fever.

Eruptive diſeaſes are generally critical and ſalutary. Thoſe children who are affected with cutaneous eruptions, as the nettle raſh, or prickly heat, are otherwiſe free from complaint; while others have diarrhœas and choleras, or intermitting fevers. A ſtrict attention to this circumſtance, and a full conviction of the alternation of eruptive and inteſtinal diſeaſes, impreſſes me with ſome reſpect for the old humoral pathologiſts, whoſe works are, perhaps, unjuſtly buried with them; and of Dr. Ruſh's diviſion of the different ſtates of fever. I have frequently ſeen them alternately in the ſame perſon; and the eruptive ſtate, when ſecondary, affords a certain prognoſis of relief. But if the eruption be ſuddenly checked by cold, particularly if accompanied with moiſture, it reverts to an inteſtinal ſtate of fever, obſtinate in the extreme.

The inteſtinal ſtate of fever, whether under the form of cholera, diarrhœa, or dyſentery, is much more tedious, and difficult of cure, than our ordinary intermittents. Choleras are not very frequent; and are generally relieved—nay, always cured—by the acknowledged ſpecific, calomel, unleſs neglected in the commencement. It is occaſionally ſerviceable to interpoſe alkaline remedies, if there be a ſuper-acidity of the ſtomach: and embrocations alſo have their effect in tranſlating the morbid action to the ſkin.

Diarrhœa is the moſt common form of this ſtate of fever, and often the moſt diſtreſſing. It is uſually neglected until it becomes mucaginous, and attended with tenefmus, aſſuming the form of dyſentery; or purely ſerous, and profuſe in the extreme. In the former caſe I uſually evacuated with *ol. ricini*, and then gave calomel in ſmall but frequent doſes; a neutral draught, compoſed of *ſal. tartari. crem. tart.* ana 3 j. *aq. bul.* ℔j. half a gill every hour; common drink, barley-water with raiſins, and a full opiate, *hora ſomni*. In the latter, or ſerous form, I uſually gave the ſalt of tartar in the form of julep, with laudanum, mint, &c. and frequently alternated with a decoction of columba and ſnake-root. In ſome caſes, Huxham's tincture, with allum, was very effectual. But,

In all degenerate ſtates of inteſtinal fever, I found a vitriolated tincture of iron (as hereafter mentioned under the head of intermittent fever), with laudanum p. r. n. the moſt effectual remedy I ever employed; particularly if it were a complicated ſtate of fever, and the debility conſiderable.

The dyſentery was never epidemic during my reſidence in the marſhy country, though annually ſporadic. The treatment varied but little from the previous, or bilious form of diarrhœa, except in the more frequent uſe of evacuants in the commencement; and an aſſiduous exhibition of alkalies and calomel, with a pill of opium and calomel at bed time, in ſufficient quantity to procure an armiſtice from pain.

But while we were labouring under remittent and intermittent fevers, our neighbours, on an adjacent ridge of hills that runs eaſt and ſouth-weſt, and divides the Pennſylvania highlands from the fens of Delaware, were infected with the dyſentery in a very mortal degree: yet the latter was confined within a parallel line of from ſix to ten miles, and was, no doubt, produced by the *marſh miaſma* becoming concentrated or condenſed in its paſſage through a colder ſtratum of air, and enabled to act more immediately on the ſtomach and inteſtines. And in Wilmington, the exhalations from an extenſive marſh, which lies on the ſouth-weſt ſide of the town, aſcend over the level of the town without much miſchief, and alight on the ſummit of the hill; producing agues and intermitting fevers, when perſons living within a few rods, and on a level with the marſh, are unaffected. Our autumnal winds are generally favourable to this transfer; as is alſo the caſe reſpecting the Welch-Tract marſhes, and adjacent hills aforementioned. The winds, at this ſeaſon, are commonly ſouthward of weſt, and, of courſe, waft the *miaſma*, in a direct current, to the ridge of hills.

Auguſt and September may, with propriety, be denominated our fever months. Auguſt, from its intenſe uniform heat and general inſalubrity, has received the appellation of the *long* month among the vulgar; but September is equally unhealthy. There is only this difference—that remittents are more frequent in the latter than in the former, and *vice verſa:* therefore intermittent fevers are the firſt in courſe.

Contrary to the obſervations of the indefatigable Jackſon, the quotidian form is much the moſt frequent. Its period of invaſion is generally between eight and eleven o'clock A. M. —rarely about noon: the chill is ſlight, but the fever violent;

always in inverſe proportions. This is the caſe in every form of intermittent; the cold and hot ſtages are directly oppoſite to each other in duration and violence.

The ſemi-tertian invades at eight or ten o'clock on the firſt day, with a chill, and recurs the next day, at two or three o'clock P. M. without a chill—fever alternately moderate and violent.

Tertians invade at two or three o'clock P. M.—chill greater than in quotidians, and *vice verſa*.

Quartans commence at five or ſix o'clock P. M.—chill greater and fever leſs than any other form.

Relapſes were, in general, milder than firſt attacks, unleſs the ſubjects were much debilitated. But degenerations critical. Quotidians often degenerate into tertians and ſemi-tertians; and the latter not unfrequently into continued fever. If the degenerated types poſtponed the acceſſion, or period of recurrence, it was always favourable, and the diſeaſe was ſhortened in duration. But if they anticipated, they became proportionably violent and tedious. The duration of intermittents may commonly be prognoſticated by the ſtate of the ſtomach and periodical type. The diſorder of the ſtomach is proportioned to the duration of the chill; and a vomiting generally occurs at the termination of the horror, or ſhivering, or commencement of the hot ſtage. And the collateral ſpecies of type, indicating danger or difficulty, is that in which there is leaſt releaſe from fever—which is uſually the ſemi-tertian.

Modus Medendi.

In the cure of intermittent fevers we may form three general indications.

1ſt. To prevent the recurrence of the cold ſtage.

2dly. To moderate the cold and hot ſtages when formed; and,

3dly. To change the ſtate of the ſyſtem, by exciting a counter-morbid action; or to reſtore its tone, and enable it to withſtand the action of the remote cauſe.

The firſt may be accompliſhed by increaſing the action of the vaſcular ſyſtem with diffuſible ſtimuli, external heat, or exerciſe. The moſt effectual mode of uſing the former is to lie in bed, covered warm, and about twenty minutes before the period of acceſſion, to take the following draught: ℞ *Spt. lavend. c. Tinct. opii. camphorat.* ana ʒ j. *ſpt. c. cervi gtt.* xl. *Ol. menthæ. pip. gtt.* i. *M. f. hauſtus.* A ſpirituous vehicle is

the moſt proper. Or, ℞ *Tinct. thebaic. gtt.* lx. *ſal. am. vol.* ℈j. *m. ſumend. ut ſupra.* The ſal. ammoniac leſſens the ſoporific powers of opium ſo much, that this potion may be taken with as much ſafety as twenty drops of laudanum *per ſe.* Or emetics, given ſo as to excite vomiting a little before, and to continue the operation after the acceſſion, not unfrequently produce a ſolution of the paroxyſm, by exciting a different morbid action. Thus active cathartics, given in the hot ſtage, are alſo often effectual in diverting the morbid action to the inteſtines—producing a counter-diſarrangement of the diſarranged action, and not merely by depletion; otherwiſe bleeding would anſwer the ſame purpoſe—which is not the fact. The ſtate of mind alſo merits a correſpondent degree of regard in the prevention and cure of intermittents. Every man that admits a phyſical neceſſity, and reciprocal dependence, ſubſiſting between the mind and body, muſt admit the plauſibility of the poſition; and he that practices it judiciouſly will not find himſelf diſappointed in the experiment, by oppoſing the ſtate of mind, previous to the recurrence of the paroxyſm, with a different impreſſion. For example: I once cured an old hyſterical woman, who was deſpondent, and prejudiced againſt medicine, by perſuading her into a chaiſe before the period of acceſſion; and, inſtead of returning her home in time to have the ague, I drove, *helter ſkelter*, over a rough piece of road; and, in her apprehenſions of being upſet, ſhe forgot the ague, and remained free from it. Perhaps the exerciſe of body might have contributed to the cure. But I knew a child that had laboured under an ague for many weeks, who was cured by falling into a creek at the commencement of the chill. He was much terrified, and the alarm diſpelled the chill. He remained well. I alſo was cured of an intermittent in a ſimilar manner, by a mental impreſſion. Juſt as the paroxyſm of an ague was recurring, I was called to a lady in parturition, and with doleful apprehenſions of my own ſufferings from the circumſtances under which I expected to ſpend the night. But my own feelings were diſplaced by an intereſt in her welfare; and I forgot my ague, and it forgot me afterwards.

2dly. When the paroxyſm is formed, we ſhould endeavour to moderate its violence. The horripilatio is moſt effectually relieved by re-promoting the circulation in the extreme veſſels, by the application of heat in a humid form, and wrapping the patient warm in bed. Immerſion is generally inconvenient: we may, therefore, ſubſtitute pediluvia fomentations to the

thorax, or, moſt effectually accompliſh the purpoſe by enveloping the patient in a blanket wrung out of hot water; and, if neceſſary, from twenty to ſixty drops of the ſpt. c. cervi, with twenty drops of laudanum, may be given in ſome warm vehicle. And if the chill can be interrupted by theſe means, the conſequent fever is principally artificial, and of ſhort duration, and has a powerful tendency to change the nature of the diſeaſe.

The febrile ſtage is announced by a vomiting, which is proportioned to the previous chill; and, if conſiderable, ſhould be encouraged by large draughts of warm water, weak chamomile tea, or a few grains of ipecacuanha, if bile is ejected. But if the ſtomach is not much diſordered, and there is no other local affection, a grain of opium, given about half an hour after the commencement of fever, has the moſt happy effect in promoting ſweat, relieving thirſt, and all the urgent ſymptoms. If there be any pain of the head, and the arterial action comparatively violent, it may be combined with tartar-emetic, ſo as to produce a ſlight nauſea, without vomiting. Having concluded a paroxyſm, we ſhould,

3dly. Endeavour to reſtore the tone of the ſyſtem, and enable it to withſtand the recurrent action of the exciting cauſe, or to excite an artificial action, as before-mentioned: and ſcrupulouſly avoid every debilitating power, every circumſtance tending to produce chilline's, and as ſtrenuouſly inculcate the uſe of moderate exerciſe in a dry air—warm clothing, a generous diet, the moderate uſe of bitters, and a removal to a higher country, if convenient.

Though fearful of having extended this number already beyond its proper limits, I wiſh to annex ſome general obſervations on the method of cure, and on ſome incidental ſymptoms: and, without repeating the encomiums beſtowed on the Peruvian bark, I ſhall recommend a ſubſtitute, much more eaſy and expeditious, and equally ſafe. To effectuate more completely the objects of our ſeveral indications, the moſt powerful remedies ſhould be reſorted to; and it may be admitted as an eſtabliſhed law of nature, that there is an antidote for every diſeaſe, though few of them are as yet diſcovered. I am aware that this poſition will be denominated dogmatical: but *experientia docet* is my creed, and experience warrants me in recommending *arſenic* as a ſpecific in the cure of intermittent fevers. It, however, is deemed unphiloſophical to acknowledge the title of ſpecific properties in medicine; and,

equally ſo, to uſe articles whoſe mode of operation you cannot explain by ſome known law of the animal economy. Yet, if every fact be rejected becauſe it is inexplicable, and nothing believed but what is ſelf-evident, our ſtock of knowledge will be but ſmall indeed.

The ſolutio mineralis arſenici of Dr. Fowler being in too uncertain a form for indiſcriminate uſe, I adopted a form of pill, compoſed of half a grain of opium and one third of a grain of arſenic, twice a-day. But finding it produce vertigo, nauſea, and an itching in the ſkin, in a few caſes; and as alkalies reſtrain the effects of mineral poiſons, I changed it for the following formula: ℞ *Ammoniæ muriatæ* ʒ j. *pulv. arſen. alb. gr.* x. *pulv. opii. gr.* xv. *ſyr. com. q. ſufficit, M. f. maſſa, in pilulas æquales* lx. *dividenda; quarum ſumat* ij. *mane et veſpere.* It is, perhaps, unneceſſary to add, that great caution is requiſite in forming the maſs. The beſt mode is to triturate the opium and ammonia together, until perfectly pulverized; then form the maſs with ſyrup, and ſprinkle on the arſenic by degrees.

I always gave them, morning and evening, without regard to the fever, and with the moſt invariable ſucceſs, in all caſes (excepting pregnancy), and to all ages, in proportioned doſes, without the leaſt bad effect. To perſons under puberty, one pill, morning and evening, is a ſufficient doſe: and for children, above one year of age, half a pill, containing one twelfth of a grain, is ſufficient. If a ſpeedy cure be urged, the Peruvian bark, or other vegetable tonics, may be given at the ſame time. In children, a bark jacket, and embrocations of the ſpine with camphorated ſpirits or volatile liniment, before the period of acceſſion, are uſeful auxiliaries.

In children, and females at the age of puberty, cachexies are not unfrequent conſequences of agues; for which the following chalybeate is a very convenient remedy: ℞ *Ferrum vitriolatum* ʒ j. *acid. ſulphuric.* ʒ ſs. *aq. font.* ʒ x. *M.*— The acid diſſolves any remaining particles of iron, and gives the ſolution an agreeably acidulous taſte. Ten drops of the menſtruum contain a grain of the ſal martis, and an adult may take twenty drops, twice or thrice a-day—children from three to ten. Whether arſenic would be actually injurious or not in the ſtate of pregnancy, I cannot determine: I did not chooſe to be the experimenter. And, perhaps, ſome may ſay, that it is injudicious, in any caſe, to uſe a remedy more formida-

ble than the diſeaſe. But it is the abuſe, and not the uſe, of many potent remedies that has ſunk them into diſgrace: and, as I have given an impartial account of its uſe, in my own practice, I am not reſponſible for its conſequences with others.

In addition to the common ſymptoms of intermittent fevers, there are many incidental occurrences that merit regard. Epilepſia (occaſionalis) is a very frequent and alarming attendant in children, during the fever; but a few drops of antimonial wine, ſo as to produce naufea, give immediate and effectual relief. And although it may be termed an unſyſtematic remedy, a reference to the immediate cauſe of the ſpaſmodic affection will remove the fallacy: for as it is a mere conſequence of inordinate action in the veſſels of the brain, whatever diminiſhes that exceſs, muſt, of neceſſity, remove the ſpaſms. If the retention of acid matter, or the preſence of worms in the alimentary canal, are ſuppoſed to be concerned, a purge of rhubarb and calomel may be given.

Enlargements of the ſpleen are not unfrequent, when the diſeaſe is neglected or improperly treated; to prevent which, proper regard ſhould be paid to the ſtate of the bowels. But when opium is given, as before-mentioned, it prevents thoſe ſchirroſities, preſerves the lymphatic ſyſtem from relaxation, and obviates dropſies: and when the ſpleen becomes ſchirrous, a gummous courſe, with mercurials, generally affords relief.

Contrary to the obſervations of the ſagacious *Lind*, the cold ſtage of intermittents, ſo far as my experience has extended, is the moſt fatal.

In all *anomalous* caſes our remedies muſt be varied according to circumſtances, without regard to ſyſtem, as human foreſight cannot provide for caſualties; though many might be mentioned, if I had not far exceeded the limits uſually aſſigned to eſſays of this kind.

I remain, dear Sir, with ſincere eſteem,
Your friend and humble ſervant,
JOHN VAUGHAN.

Wilmington, October 6, 1799.

P. S. As I have lately met with a caſe of *tetanus* analogous to the epilepſia occaſionalis afore-mentioned, it may not be improper to annex it here.—A young woman of a remarkably florid complexion, and rather diſpoſed to ebriety, had a phlegmonic ſwelling in the palm of her left hand. When

called, I found her hand much ſwelled—her arm inflamed to the elbow, attended with violent fever and ſubſultus tendinum. I then drew ſixteen ounces of blood, gave a cathartic, and enveloped the hand in an emollient poultice, to facilitate the diſcharge. It had been opened, but the diſcharge was very partial. She was conſiderably relieved of fever, and the ſpaſmodic affections, for twenty-four hours; but on the evening of the next day the pain became excruciating in the extreme, extending up her arm to her neck, with raging fever, and ſoon attended with perfect opiſthotonos. Taking advantage of the firſt interval, I gave twenty drops of antimonial wine, which releaſed the ſpaſms as ſoon as nauſea was produced: they, however, returned at intervals of two and three hours, during the next day, but were always relieved by the nauſeating potion.

This method of treating tetanus is diametrically oppoſite to the caſes mentioned by Dr. Hoſack, in Medical Repoſitory, vol. iii. p. 21 &ſeq. But, I preſume, the methods of cure are not leſs diverſified than the cauſes of diſeaſe.

J. V.

ARTICLE II.

On the ECONOMY *of* FUEL *in the* WARMING *of* ROOMS: *Communicated in a Letter from* SIMEON DE WITT, *Eſq. Surveyor-General of the State of New-York, to Dr.* MITCHILL.

My Dear Sir,

I HAVE always conſidered ſtudies, having for their object the means of leſſening the labour or expenſe neceſſary to procure the comforts of life, among the moſt uſeful in which man can be engaged. Every diſcovery made in ſuch purſuits is valuable, even if the occaſion to which it may be applied be temporary and tranſient in its nature: but if its advantages are of ſuch a kind as that a great part of the bulk of mankind may be benefited by them, not only for the preſent, but for ages to come, its value will puzzle the powers of calculation. Theſe reflections have been excited in the courſe of thinking

on the ſubject which I purpoſe now to exhibit, as conciſely as poſſible, in the various lights in which it has preſented itſelf to my view. *The beſt methods of warming rooms, in order to make them comfortable habitations in cold weather*, ſeem to me to merit an inquiry, as a ſubject ſtill very much in the dark. If, by means of the light which I can throw on it, others ſhould be led to ſuch improvements as that the worth of one cord of wood can be ſaved in the courſe of a year in any one family, I ſhall not deem my time wholly miſpent. If it ſhould lead to the ſaving of as much in as many families as I can bring to my imagination in the different towns in our cold climate which might avail themſelves of ſuch improvements, I would, with unuſual pride, look forward to the good I was about doing. And if I ſuffer my fancy to go ſtill further, and conſider that if my attempt be ſucceſsful, I may be the means of ſaving as much as would amount to a handſome national tax on future generations, I would be almoſt vain enough to think myſelf a great public benefactor. But, on a ſecond reflection, I find my vanity repreſſed by conſidering that theſe obſervations will, more or leſs, apply to every improvement; and, in truth, I intended them merely as an apology for myſelf, among many others, who waſte ſome of their time, and often to little purpoſe, in muſing on what may be done to combat the hardſhips to which our race of beings is expoſed from the attacks of the elements, and the importunities of our paſſions and appetites.

With thus much of an introduction, I ſhall proceed, without further ceremony, to my ſubject.

A given quantity of fuel, when burnt, will give a certian quantity of heat. Means may be uſed to increaſe the intenſeneſs of it, but it is not pretended that its *quantum* can be augmented. The thing under conſideration, then, is only how ſuch a given quantity of heat can be applied to the uſe intended with the leaſt waſte. The uſe intended is to warm the air of a room, and to preſerve its warmth as long as is poſſible, conſiſtent with health and comfort. This divides my inquiry into two branches, which I ſhall conſider ſeparately, and begin, *firſt*, with THE MEANS OF PRESERVING HEAT IN A ROOM.

From the properties of airs of different temperatures, it follows, that where currents of theſe meet each other, that which is coldeſt will paſs below, while that which is warmer will make its way in an oppoſite direction above it. In this

manner the air next to a fire-place being warmed, will aſcend to the ceiling, and move along it to the walls, where it will be drawn into currents that enter by the crevices of the doors and windows, and return with them, to ſerve the draught of the chimney: for the air that goes up the chimney, or, in other words, the whole draught of the chimney, muſt be ſupplied by an equal quantity of air coming into the room through ſome opening or another. The air warmed by the fire, in the paſſage which it immediately takes, as juſt mentioned, parts with the greateſt proportion of its heat to the ceiling and walls along which it moves, as well as to the entering air with which it mixes, before it can benefit us on its return in the lower part of the room; and thus the greateſt part of the heat emitted from the fire is abſolutely loſt to us. How is this to be remedied, becomes, therefore, a primary queſtion in our inveſtigation.

If we could point out a method to make the ceilings, walls, and floor, of materials that would be perfect non-conductors of heat, and, at the ſame time, could prevent freſh air from coming into the room, it is evident the queſtion would be completely anſwered; or, in other words, ſuch a room, once warmed, would remain warm forever. But no ſuch materials are to be had; and freſh air muſt be admitted into rooms, both for the purpoſes of breathing and ſupplying the draught of the chimney. All we can do, therefore, is to endeavour to come as near to this ſcheme as the nature of things will admit.

From the circumſtances ſtated, it appears obvious that very much will depend upon the materials encloſing the room. Whether they be ſubſtances that will readily or difficultly abſorb or carry away heat, will make a vaſt difference in the properties of the room. An inquiry reſpecting theſe properties, as reſiding in the different ſubſtances that may be uſed, therefore, becomes neceſſary.

If we take two wires, one of glaſs and the other of metal, and hold them between the fingers, at no great diſtance from their ends, applied, at the ſame time, to the blaze of a candle, the one made of metal will ſoon communicate an intolerable heat; while the other produces no ſuch effect. From this familiar experiment it is then apparent that metal is a ſtronger conductor of heat than glaſs, or that heat will be carried away more rapidly, and in greater quantities, from a body that is charged with it to any other leſs charged, when metal makes the communication, than when glaſs is interpoſed.

If the hand be applied to furs, or ſoft woolen ſtuffs, expoſed to the coldeſt weather, no ſenſation of cold, excepting for the firſt moment, is felt; whereas, when applied to metals, ſtones, and many other ſubſtances that have, in the ſame manner, been expoſed, the cold will be unſufferable and permanent. The philoſophy of theſe phenomena is this: *When heat, by any cauſe, is more rapidly taken from any part of the human body than it is generated by the animal functions, the ſenſation of cold is produced; and if any thing prevents its eſcape as faſt as it is thus generated, a ſenſation of heat is the conſequence.* It follows, then, that furs and woollens are ſuch imperfect conductors of heat, that when a limb is wrapt up in them they refuſe to carry off the heat as faſt as it is generated, which, in ſuch a ſituation, is ſometimes accumulated to ſuch a degree that nature is obliged to call to its aid an extraordinary ſupply of the moiſture of the body to carry it away.

Theſe inſtances will ſhow what is meant by conductors and non-conductors of heat, and how it may be determined, by trial, what the properties of different ſubſtances are in ſuch reſpects. It is, beſides, ſaid, that non-conductors of electricity are generally imperfect conductors of heat. Such, among others, is dry air; and this explains why things of a looſe, porous texture, are found warmer, to uſe the common expreſſion, than thoſe of a more compact make, as is the caſe with feather beds, quilts, blankets, baiſes, carpeting, &c. In addition to the non-conducting qualities of the materials of which they are made, it is greatly owing to the ſtagnant air contained in the vacuities of their compoſition that the paſſage of heat is obſtructed and prevented. From this, by the bye, may be underſtood the neceſſity of airing beds and bed-clothes every day, in order to expel the great quantity of moiſture they imbibe from uſe in the courſe of the night, if we expect all the warming effects they are intended to produce. A practice too much neglected, at the expenſe of health and comfort.

Theſe hints will aſſiſt the architect in the choice of his materials for conſtructing houſes beſt fortified againſt the winter's cold. Walls made of ſeaſoned timber, if my theory is right, will always be better for this purpoſe than thoſe made of ſtone or brick, and if they are made hollow they will be ſtill the better. In this view I admired a houſe built by our old friend Judge Zephaniah Platt, of Plattſburgh, which I lately had an opportunity of ſeeing. It is a frame building, incloſed

with thick boards, all the edges of which are grooved with a carpenter's plow. They are joined together by ſinking the inner edges of the upper boards into the grooves of the lower ones; while the outer edges of the lower boards go into the grooves of the upper ones. This contrivance, while it makes the encloſure perfectly tight, adds handſomeneſs to the appearance. The inner part of the wall is made of brick, maſoned up between the poſts, ſo as to leave a few inches between them and the external incloſure. By theſe means the whole houſe is, with little interruption, ſurrounded, by a hollow wall, containing a body of air, cloſely confined, to guard againſt an eſcape of heat from the rooms.

The hollow which is commonly left between plaiſtered ceilings and the upper floors to which they are attached, helps, in the ſame manner, conſiderably to preſerve the warmth of rooms. But it is to be obſerved, that the coats of plaiſtered walls and ceilings are generally made as ſmooth as poſſible; and poliſhed ſurfaces allowing circulating airs to come in contact with them in more numerous points than others would do, they will, of courſe, have the power of depriving aërial fluids of their heat with greater facility, both on account of their ſmoothneſs, and the denſeneſs of texture they have acquired by the operation giving them that finiſh, and from which they have received almoſt the properties of ſolid ſtone.

Upon the whole, I know no better way to ſecure the warmth of a room than by clothing the walls and ceiling with tapeſtry, or ſomething poſſeſſing ſimilar qualities. This would be the moſt effectual guard againſt cold, and might be done with a degree of elegance, or, if you pleaſe, with a magnificence, ſuperior to what any mode now cuſtomary affords. At the ſame time, by only varying the materials, the ſame end might be attained conſiſtent with the ſtricteſt economy. For inſtance; green baize, which is a cheap article, if handſomely ſpread along a rough caſt ceiling, would by no means make an inelegant appearance; nor would it have an unpleaſant effect if a room were entirely hung round with it. Furs, as uſed in the hats of the inhabitants of the frigid zone, anſwer the ſame purpoſe in a much more perfect and admirable manner. We, however, would object to their expenſiveneſs, as well as their ſavage appearance.

I forbear to enumerate materials that might be employed for the purpoſes in view, ſince the principles laid down will ſufficiently direct to a proper ſelection of them.

I ſhall now, *in the ſecond place*, beſtow ſome reflections ON THE MEANS OF COMMUNICATING HEAT TO ROOMS. Theſe are of various kinds: but before we take a view of them, in order to aſcertain which are the beſt, it will be proper to conſider how fire, and the heat produced by it, act.

While fuel is burning, the heat generated is conveyed to diſtant bodies in two ways. One is, in ſtraight lines or rays, carried in every direction from the fire, with the light which it emits. The other is with the ſmoke or vapour that riſes from it. The beſt contrivance to catch the heat in its flight either way, and ſubject it to our uſe, is what we are in ſearch of at preſent.

Of the heat which is ſent forth in direct rays from the fire, the proportion received into the room, compared with the whole, may be calculated on pretty accurate data. Suppoſe, in a common fire-place, the centre of the fire to be the centre of a ſphere of a given ſize, and an infinite number of rays or radii drawn from the centre of this ſphere to its ſurface, ſo as to touch the floor, jambs, and bottom of the mantle-piece; the ſpace comprehended by the lines connecting the interſections of thoſe radii on the ſurface of the ſphere, compared with the remainder of its ſurface, will give the proportion of the heat that is thrown directly into the room, compared with what falls on the hearth, chimney, jambs, and back of the fire-place, and which cannot enter the room but by reflection, or ſome other circuitous rout. From the common fire-place little heat is obtained, beſides what comes in this direct manner. It therefore muſt be obvious, governing our calculations in this manner, how much depends on the depth or ſhallowneſs of the jambs, and how much may be gained by giving the wideſt poſſible opening for the fire to ſpread its rays through a room.

It is on this principle that Count Rumford's celebrated fire-place is conſtructed, and from which it receives its principal advantages. It is true, he recommends whitening the back and jambs, with a view to gain, by reflection, the benefit alſo of the heat that may be intercepted by them; but this, in my opinion, can be but trifling.—Highly poliſhed ſurfaces only can, in a material degree, ſerve us in this reſpect; and theſe it would be difficult to preſerve in ſuch a condition.

But it is a matter vaſtly more important to arreſt and ſecure the heat which is carried away by the ſmoke or vapour riſing from the fire, as well as that which is abſorbed by adjoining

bodies, and uſually conducted to the external parts of the houſe. The quantity of heat thus loſt will appear, by calculations made in the manner before-mentioned, to be much greater than that which is thrown directly into the room.

The contrivances in common uſe, intended to anſwer this purpoſe, are chiefly the cloſe ſtove and the Franklin. The advantages of the cloſe ſtove are theſe: Its draught is ſmall, and requires, of courſe, but a ſmall quantity of cold air to be admitted into the room to ſupply it. The fire comes largely in contact with its ſides, which being of iron, readily conduct the heat into the room, and little of it is carried away by the draught. Its diſadvantages are, its inelegancy, and the diſagreeableneſs and unwholeſomeneſs of the air which it heats: it is, however, the cheapeſt method in uſe for warming a room, though it can claim, even in this reſpect, but a trifling preference to the pipe Franklin. The Franklin is either maſoned to a chimney, or placed, independent of a wall, with a pipe to carry off the ſmoke. The latter kind differs little from the cloſe ſtove, as juſt now obſerved, in its qualities for warming a room. It requires, however, more air for its draught; but, at the ſame time, it gives a direct heat in the manner of a common fire-place.—The Franklin, maſoned to a chimney, differs from the common fire-place only in this reſpect. Beſides the properties common to both, it ſends up a current of heated air from its top and ſides, which eſcapes the draught of the chimney till it has made the circuit of the room.

Beſides theſe, ſeveral other contrivances have been made, which it is not neceſſary to my deſign to make ſubjects of critical remarks. I think it proper, however, to obſerve, that the one lately communicated to the Society for the Promotion of Agriculture, Arts and Manufactures, by Mr. Stevens, is well worth attention. As it is in the nature of an appendix to the common fire-place, the heat gained by it is a clear ſaving.

I ſhall now, by way of concluſion, give two projects of my own. The one is the moſt perfect I can think of for introducing the heat of a fire into a room; the other I would call the ſimpleſt and moſt convenient: both being conſtructed with an eye to the preſervation of a due degree of freſhneſs and wholeſome reſpirability in the air.

The one to bring as much as poſſible of the heat of a fire into a room would be this: Let a pipe Franklin be placed in a common fire-place, whoſe chimney ſhould be of ſuch a

width that the pipe might run through it without touching its ſides. Let the pipe be thus carried through it beyond the top: let the top of the chimney be then cloſed round the pipe air-tight: let a tin tube, of about two inches diameter, be carried from the lower part of the buildings, on its outſide, to the top of the chimney, and there communicate with it: and, laſtly, let an opening be made from the chimney to the room, a little below the ceiling. Perhaps it will be of ſervice to have the inſide of the chimney white-waſhed. The operation of this conſtruction would be thus: The heat which would not be directly emitted into the room would aſcend with the ſmoke into the pipe, which would readily abſorb and tranſmit it to the air, in the ſpace of the chimney ſurrounding the pipe; and the current of air conſtantly preſſing into the top of the chimney, through the tin tube, would force this heated air down into the room, through the opening near the ceiling: ſo that all the heat communicated to the pipe, from its bottom to its top, would, with little exception, be carried back into the room; and this, in a high chimney, would be nearly all that is carried away by the ſmoke. The draught, moreover, would thus be ſupplied by warm inſtead of cold air. The ſame contrivance may be applied to a common fire-place, by cloſing the bottom as well as the top of the chimney round a pipe faſtened in it to carry off the ſmoke.

My other project is this: Maſon a caſt iron plate for the back of the fire-place in the uſual poſition, a few inches from the back of the chimney. Let a ſheet of plated iron be joined to the top of the back plate, and carried perpendicularly up as high as the ceiling of the room, with its edges maſoned in the ſides or jambs of the chimney, and its top bent backwards, and faſtened into the back of the chimney. From the hollow ſpace between this iron partition and the back of the chimney make ſmall openings through the jambs, one on each ſide, near the floor, and one on each ſide, near the ceiling.—The operation of this contrivance would be thus: The heat that would otherwiſe eſcape with the ſmoke will, in a great meaſure, be communicated to the iron partition, and thence to the air behind it, which would immediately aſcend, and paſs into the room through the upper openings; while the colder air would preſs into thoſe near the floor, thus making a quick circulation through the cavity between the iron plates and the back wall. By thoſe means the heat of the chimney would be drawn into the room with great rapidity; for the quicker

the ſucceſſion of freſh air, or any other vehicle coming into contact with a heated body, the greater will be the quantity of heat conducted from it in a given time.

The ſimplicity, cheapneſs, efficaciouſneſs, and conveniency of this contrivance, I think, muſt recommend it. It takes away no room; it does not affect appearances; its expenſe is trifling. In ſhort, it poſſeſſes all the good properties of the Franklin, but in a more perfect manner, and in higher degrees, without its chief inconveniences; and the firſt opportunity I have, I intend to make an effectual trial of it.

With ſincere regard,
I am, dear Sir,
Your obedient ſervant,

S. DE WITT.

Albany, December 26, 1799.

ARTICLE III.

On the INTERNAL USE *of* SACCHARUM SATURNI (Acetate of Lead) *in* DIARRHŒA: *In a Letter to* JOHN CLAIBORNE, *M. D. of Virginia.*

By JOHN ARCHER, *jun. M. D. of Maryland.*

HAVING been frequently baffled in my attempts to cure diarrhœa, particularly of the chronic kind, in purſuing the directions laid down by medical authors, I was naturally led to ſearch for ſomething, from which certain relief might be obtained in all caſes. The acetate of lead, on this occaſion, preſented itſelf to me as a medicine from which I hoped to have my wiſhes anſwered; and I here give you the reſult of my experience and obſervations reſpecting the uſe of it, in a few caſes, drawn up at the time they occurred.

CASE I.

Mr. S. R. aged 22 years, a man of a ſtrong conſtitution, was, in June, 1798, after ſevere exerciſe, attacked with a

ſevere dyſentery, which, after a continuance of about four weeks, in ſpite of every exertion to remove it, terminated in a painful diarrhœa, which continued unreſtrained until the latter end of November. His body preſented a picture of the greateſt emaciation I ever beheld. He had frequently, during this time, much pain in his bowels, and oftentimes diſcharged conſiderable quantities of blood. The Materia Medica was ranſacked, and every thing fairly tried that promiſed any relief; but in vain, until reflection ſuggeſted to me the uſe of the ſaccharum ſaturni. I at firſt had it adminiſtered to him by way of injection; but that not anſwering any purpoſe, I determined, in this critical caſe, to give it internally. I began by giving him three grains, three times a day, formed into a pill, with a little ſyrup, and left him, with directions to lay it aſide as ſoon as his purging moderated. After taking it two days, his diarrhœa had conſiderably abated; and, notwithſtanding my directions, which were particularly enjoined (for he ſaid he was fearful his purging would return or increaſe), he continued taking the pills. The conſequence was, he became coſtive. He had not a dejection for twenty-four hours, and he had extreme pain in his bowels. This, however, was ſpeedily removed, upon the operation of a doſe of Glauber's ſalt (ſulphate of ſoda), which he had taken before I ſaw him. His purging again returned; but by uſing the ſaturnine pills, which I reduced to two grains, with the neceſſary cautions, he kept his diarrhœa under, and, in the courſe of two or three weeks, it had entirely left him. He recovered, in the courſe of the winter, his fleſh and ſtrength, and, although not quite ſo ſtrong, he ſays he is as well as he ever was in his life.

Case II.

Mr. C. L. about 35 years of age, was, in the month of November, the ſame year, ſeized with a violent dyſentery. It continued eighteen days, and terminated in a ſevere diarrhœa, which reduced him greatly. After uſing the uſual medicines recommended for ſuch caſes, without any kind of relief, I put him upon the uſe of the ſaturnine pills, two grains three times a day, with the particular directions; and, in three days, his diarrhœa was entirely removed, without the occurrence of an unpleaſant ſymptom. He rapidly recovered fleſh and ſtrength, and is now perfectly well.

Case III.

Mr. W. M. about 50 years of age, with a diarrhœa of two months ſtanding, began the uſe of the ſaturnine pills under my direction. They removed it, in a few days, without any ſymptom of cholic taking place. He was recovering ſtrength rapidly—went out from home, and did not return until a late hour of a damp night. He relapſed, and died in four days.

I could give you ſeveral other caſes in ſupport of the efficacy of the acetate of lead in diarrhœa, but I preſume I have given a ſufficient number to warrant a trial of it. I have found it a valuable medicine in the diarrhœa that we often find take place in low fevers, phthiſis pulmonalis, &c. I here ſubjoin an extract of a letter I received from my worthy and ingenious friend, Dr. William Harris, of Mifflin County, Pennſylvania.

"*Belle-Fonte, Auguſt* 30, 1799.

"Dear Sir,

"I received your favour of the 4th of July, mentioning the great benefit you have derived, in your practice, from the internal uſe of ſaccharum ſaturni in diarrhœa. Since then I have had opportunity of making uſe of it in two caſes, and am happy to inform you that the reſult confirms your practice. One patient, a child of three years of age, had been four days violently purged: its motions were every half hour, or oftener. I gave it the third of a grain of the acetate of lead every hour, in the form of a pill; and, in twelve hours, the diarrhœa had entirely left it. The other was a child two years old: it had been labouring under a continual purging ſince it was three months old: the fæces were frequently mixed with blood. I had previouſly given it all the medicines I could think of without any good effect. The child was reduced to a mere ſkeleton, but had a good appetite.—I gave it the third of a grain of the ſaccharum ſaturni every two hours, formed into a pill. In two days the diarrhœa had entirely left it, and it is now recovering in fleſh and ſtrength. The firſt of theſe caſes might, I make no doubt, have yielded to the ſeveral remedies in ſuch caſes, had I exhibited them; but the other, which was chronic, was, beyond every doubt, cured by the ſuperior virtues of the ſaccharum ſaturni. From the trifling experience I have had of it, I conſider it as an important and valuable medicine in diarrhœa.

"WILLIAM HARRIS."

Whether diarrhœa depends upon an increaſed action of the blood-veſſels of the bowels, or upon a retrograde action of the inteſtinal abſorbents; whether the ſaccharum ſaturni cures by leſſening the action of the ſanguiferous veſſels, or by increaſing a proper action of the inteſtinal abſorbents, are queſtions of no ſmall magnitude. I do not, however, heſitate to ſay, that in all caſes of diarrhœa there is an increaſed action of the blood-veſſels of the bowels: indeed, we often, even in chronic diarrhœa, find this exceſs of action in the pulſe. The operation of the acetate of lead appears to be the diminiſhing the action of the ſanguiferous veſſels, and equalizing the ratio of action between the ſanguiferous and abſorbing veſſels. Now, whether the action of the abſorbents is increaſed poſitively, or only relatively, is not ſo eaſy to determine. It is certain, that in this diſeaſe the periſtaltic motion of the inteſtines is increaſed, and it appears probable that the diminution of arterial action, a well known effect of the ſaccharum ſaturni, produces a more regular periſtaltic motion.

I find there are many inſtances on record, to prove the deleterious effects of lead upon the human body, when long perſiſted in, or taken in large quantities. From theſe facts, the practice I have here recommended will, no doubt, by many, be conſidered, at beſt, as raſh and hazardous: but, becauſe, under ſuch circumſtances, it has produced colica pictonum, convulſions, and death, ſhould theſe be reaſons why its preparations ſhould not be adminiſtered in diſeaſes, in moderate doſes, under the direction of a cautious and judicious phyſician? By no means. What are the conſequences of large doſes, or a long continuance of opium, ſtramonium, arſenic, &c. exhibited by the ignorant and injudicious?—Equally dreadful: tremors, vomiting, vertigo, convulſions, and death. And, on the other hand, what are not the good effects of theſe medicines, when adminiſtered with judgment and care? Let the practitioner of medicine anſwer for himſelf. I have often thought of the propriety of the aſſertion made by an Engliſh phyſician, and I think it applicable in the preſent inſtance, that "poiſons, in ſmall doſes, are the beſt medicines, and the beſt medicines, in large doſes, are poiſonous."

Dr. Reynolds, of London, in a letter to Sir George Baker, has given us ſome caſes of hæmorrhagia uterina, hæmoptyſis, &c. in which he had uſed the tinctura ſaturnina, and ſaccharum ſaturni, with the greateſt and moſt decided advant-

age.* Dr. Reynolds appears to think that the thebaic tincture, adminiſtered with the ſal plumbi, will prevent cholic taking place. It may be ſo; but I conceive that if a conſtipation of the bowels were prevented during the uſe of it, no ſymptom of cholic would appear. Dr. Barton, you may recollect, in his learned and ingenious lectures on the Materia Medica, mentioned that it had been made uſe of by ſeveral phyſicians, in hæmorrhagies, with good effect. Might it not be given, with advantage, to children in cholera infantum, a diſeaſe ſo prevalent, and which every year ſwells the bills of mortality in our cities? As dyſentery depends upon an exceſs of action in the blood-veſſels of the bowels, and as the ſaccharum ſaturni poſſeſſes the property of leſſening that action, what would be the effect of it in that diſeaſe? It is, in my opinion, in the hands of a judicious practitioner of medicine, a ſafe and valuable article of the Materia Medica. I hope a few trials will induce you to think favourably of it.

JOHN ARCHER, *jun.*

January 6, 1800.

* Vide Duncan's Med. Comment. vol. vi. Philadelphia edit.

ARTICLE IV.

ON THE SUBMERSION OF SWALLOWS.

From an Anonymous Correſpondent.

To the EDITORS *of the* MEDICAL REPOSITORY.

Gentlemen,

I OBSERVE your correſpondent, Mr. Peter Cole, in No. 2 of vol. ii. of your Repoſitory, has revived the opinion, which I thought had been exploded, of the watery ſubmerſion of ſwallows. This ſubject has been, for a length of time, agitated by naturaliſts. The Swediſh philoſophers are unanimous in the affirmative, and Kalm, in his travels through this country, gives a ſtatement of all the facts that ſupported the opinion in his native country. Meſſrs. Pennant, John Hunter, and Smellie, are decidedly oppoſed to the opinion. It

would take up too much room in your Repoſitory to detail all the arguments againſt it; but a ſummary of them may be uſeful to thoſe who have not yet examined the merits of both ſides of the queſtion.

The arguments againſt the opinion of ſubmerſion are derived,

1. From the impoſſibility of any land animal exiſting without reſpiration.

2. The want of that ſtructure of the internal organs of the ſwallow which is eſſential to the exiſtence of all animals under water.

3. From the ſpecific levity of the bird. This is ſo great, "that their continuing for months under water amounts (ſays Smellie) to a phyſical impoſſibility."

4. From their certain deſtruction by ſeals, otters, fiſh, turtles, and eels.

5. "From the impoſſibility of their moulting, while in a ſtate of torpidity, at the bottom of lakes; (as they moſt certainly do change their plumage while abſent from us.")*

Upon a firſt view of this ſubject, and of the above arguments againſt the opinion of ſubmerſion, we would be diſpoſed to doubt the poſſibility of ſuch an event; but your correſpondent, Mr. Cole, ſpeaks poſitively as to the fact, and ſays that, "in the twinkling of an eye, they diſappeared under the water, and roſe no more." It is far from my intention to doubt the word of your correſpondent. I believe he relates what he thinks he diſtinctly ſaw. But, is it not poſſible he may have been miſtaken? He ſays he "was ſtanding at the edge of the pond with his ſpy-glaſs;" and if he depended upon following the birds in their very rapid and irregular flight with that inſtrument, I believe no one would heſitate a moment in ſaying that it is impoſſible for him, or any other perſon, to ſpeak poſitively as to the cauſe of the diſappearance of the birds; and, it is more than probable, they ſuddenly alighted upon the edge of the water, at the corner of the pond moſt remote from the ſpot in which he ſtood. For my own part, I am diſpoſed to think this was the caſe, and *I wiſh he would have the goodneſs to inform us, whether he actually ſaw them plunge into the water, and ſaw the waves which muſt have enſued their ſubmerſion.* If he anſwers in the affirmative, I will give up the controverſy; but if otherwiſe,

* Gent. Mag. for April, 1796.

the mere "diſappearance" of the ſwallows cannot be admitted as a certain proof of their ſubmerſion.

Without depending upon the arguments adduced above, againſt the poſſibility of the ſubmerſion of ſwallows, I think the following experiments ſatisfactorily prove that this ſtate is incompatible with the future exiſtence of theſe birds. They are related in the Gent. Mag. for June, 1796.

"Some of the laſt days of May being cold, wet, and windy, I obſerved that the *hirundines*, in general, became leſs active, and manifeſted much the ſame appearance as they do at the cloſe of the ſeaſon, when they are about to leave us; and, particularly on the 31ſt, they were ſo enfeebled by the rough cold gales and heavy ſhowers, that, in the courſe of the day, many were eaſily taken by the hand, ſitting torpid under the eaves of houſes, and other places of ſhelter; even the ſwifts were ſo benumbed and tired as to ſettle on the hands and heads of ſeveral perſons who were obſerving their uncommon appearance in the meadows. I had ſeveral *hirundines* brought me in the evening, which appeared to be dying. Their eyes were cloſed, and their wings drooping, ſo that they would continue in any poſition in which they were laid. I wrapped ſome in flannel, and depoſited them in a warm room, and, in leſs than an hour, they became as active as I ever obſerved them; but, on expoſing them to the cold, they became torpid as before; in which ſtate I affixed weights to the feet of two of them, and carried them to the meadows whence they were taken, and immerſed them gradually in a ditch, among ruſhes, where I had obſerved the firſt that made their appearance this year, that, if they had emerged thence, the experiment might be tried in the water and place that had preſerved them throughout the winter. I immediately had cauſe to conclude they were drowning; for, when they firſt came in contact with the water, it rouſed them from their lethargy, and, when fully immerſed, the air eſcaped from them copiouſly, cauſing large bubbles on the ſurface of the water. In this ſituation I left them till early the next morning, when I eaſily recovered them from the bottom of the ditch by a ſtring that attached to them. Having taken them home, I depoſited them in wool, and placed them at a conſiderable diſtance from my kitchen fire. At intervals I removed them nearer; ſo that, in about three hours, their plumage was dried, and, in an hour more, their bodies had acquired a natural blood-heat; but not the leaſt ſigns of re-animation appeared: ſo that, when I deſpaired

of recovering them by the aid of the fire, I placed them full in the warm rays of a forenoon's ſun, where I ſuffered them to continue till the meridian, when they remained as torpid as ever. That they might receive every poſſible aſſiſtance, I then tried the powers of electricity, but equally in vain; for, though the friction was increaſed ſo as to expand their wings, their life had for ever fled! and, in two days more, their bodies were haſtily becoming corrupt; whilſt thoſe that were *preſerved* from the *genial* fluid, through the influence of the warm ſun, the next morning took their flight in the more beneficent element of air."

In addition to the above convincing proofs, the following may be given. They are taken from the Gent. Mag. for May, 1796. The writer ſays the facts were ſtated to him by the late Mr. John Hunter, of London, whoſe enthuſiaſm for the proſecution of experimental knowledge is well known.

"In the month of September he prepared a room, with every accommodation he could contrive, to ſerve as a dormitory for ſwallows, if they were diſpoſed to ſleep in winter. He placed, in the centre, a large tub of water, with twigs and reeds which reached to the bottom. In the corners of the room he contrived artificial caverns and holes, into which they might retire; and he laid on the floor, or ſuſpended in the air, different lengths of old wooden pipes, which had been formerly employed in conveying water through the ſtreets. When the receptacle was rendered as complete as poſſible, he then engaged ſome watermen to take, by night, a large quantity of ſwallows that hang upon the reeds of the Thames about the time of their departure. They brought him, in a hamper, a conſiderable number, and ſo nicely watched the time, that on the very day following there were none to be ſeen.

"He put the ſwallows into the room ſo prepared, where they continued to fly about, and occaſionally to perch on the twigs, &c. but not one ever retired to the water, the caverns, holes, or wooden pipes, or ſhewed the leaſt diſpoſition to grow torpid. In this ſituation he let them remain until they all died but one. This appearing to retain ſome vigour, was ſet at liberty, when it mounted out of ſight, and flew away. All the birds lay dead, ſcattered about the room, but no one was found aſleep or torpid, or had (if I rightly remember) crept into any of the receptacles he had ſo provided."

The firſt of theſe experiments ſhews, that ſwallows, like all other animals in which the circulation is carried on, as in our-

ſelves, cannot revive after ſubmerſion any length of time: and, allowing the narration of Mr. Hunter's experiments to be accurate, they prove that neither ſubmerſion nor hybernation are eſſential to ſwallows. But it is a well eſtabliſhed fact, that ſwallows have been found in a torpid ſtate in banks, old trees, and dry wells, during the winter, and alſo at the bottom of ponds when drained.* It would ſeem, therefore, that ſome animals, when confined, will not purſue the ſame courſe of procedure as when they are at perfect liberty: and the fact of the elephant, which has never been known to increaſe in a menagerie, might be brought in proof: but to this, again, may be oppoſed that of the rattle-ſnake, and of other animals which hybernate, whether they are in a houſe or are free. The repetition, therefore, of Mr. Hunter's experiments, would be well worthy the trouble of thoſe who could conveniently attend to them.

But granting that ſwallows do actually bury themſelves under water during winter, it muſt be recollected that this is not all we have to conſider. A queſtion of equal importance is, Who has ſeen ſwallows coming out of ponds, rivers, or lakes? Unleſs this can be proved, it will reſult, that nature orders a certain ſpecies of ſwallow to be annually deſtroyed; for deſtruction muſt follow their reſidence in mud or water, unleſs it can be ſhown that the ſame effects will not follow from ſimilarity of organization in different animals.

That ſwallows do migrate has been proved beyond a doubt, by Mr. P. Collinſon, from the teſtimony of the late Sir Charles Wager, on board of whoſe ſhip, in the Britiſh Channel, they alighted, apparently exhauſted, after a long flight. Mr. Adanſon alſo proves the appearance of thoſe birds in Senegal, during the winter. No doubt remained of their identity; for, having caught four of them, he found them to be the true European ſwallow. Mr. White, in his Natural Hiſtory of Selborn, likewiſe mentions his having ſeen, on Michaelmas day, a large flock of ſwallows flying towards the ſea.

Linnæus enumerates twelve ſpecies of the hirundo; of theſe, four are found in Pennſylvania, according to Barton, viz.

Hirundo purpurea, or purple martin.

Hirundo ruſtica, or houſe ſwallow.

——— ———, or little bank martin.

Hirundo pelaſgia, or chimney bird.

* Tranſ. Acad. Sciences, Boſton.—Pennant.

He thinks they are all migratory birds. But he admits that ſwallows have been found under mud, and in the hollows of decayed trees, during that very ſeaſon when it is ſuppoſed thoſe birds are in a more ſouthern climate. "Theſe inſtances, however," he thinks, "only ſhew the accommodating powers of birds, which ſometimes continue in a country the whole year through, and, in other times, migrate from thoſe countries." But this explanation will not ſatisfy us as to the contradiction between the recovery of the bird after a winter reſidence in mud, and the ſtructure of its vital organs. Theſe events could not take place merely from an "accommodating diſpoſition." As an anatomiſt, he muſt know that they muſt depend upon the organization of the bird; and I ſhould be happy to have his ideas upon this ſubject communicated through the medium of the Repoſitory.

ARTICLE V.

A SHORT ACCOUNT *of an* EPIDEMIC YELLOW FEVER *which prevailed in the Autumn of* 1798, *in the Village of Port-Elizabeth, New-Jerſey: Communicated in a Letter from Dr.* GEORGE LEE *to Dr.* MITCHILL.

Sir,

THE weather which preceded, and exiſted during the continuance of the diſeaſe, together with a deſcription of Port-Elizabeth, as reſpects its ſituation, I will tranſcribe from a letter which is in my poſſeſſion, addreſſed to my brother, James Lee, by Dr. Azel Peirſon, in anſwer to ſome interrogations drawn up by myſelf. Dr. Peirſon practiſed phyſic in Port-Elizabeth at the time the epidemic exiſted there, and was then the only phyſician of reſpectability in that place.

"The weather that preceded, and exiſted during the prevalence of the diſeaſe, was hot and dry, with the wind generally from ſouth to ſouth-weſt, or weſt: in the meantime ſome ſhowers of rain, though few.

"Port-Elizabeth is ſituated upon a neck of land of a moderate height, and level; remarkably ſandy; covered chiefly with pine timber, and ſome oak. On the eaſterly ſide there

is a ſmall creek, at the diſtance of one mile; from the mouth of which, upwards, for about three fourths of a mile, there is a large body of drained meadow, generally more damp than what is uſual in that neighbourhood. On the ſouth, diſtant from three fourths to one mile, is *Maurice River*, which, as far as the tide ebbs and flows, is, on its ſides, remarkably muddy and miry. Back from this there is fine meadow, high and dry, until you approach the upland, where there are large bodies of ſwamp, which are muddy, and generally with more or leſs water on their ſurface. This is more eſpecially the caſe on that ſide of the river which is oppoſite to Port-Elizabeth. That which is on the ſame ſide, and more immediately in the neighbourhood, is high, and much better drained; though here, in ſome places towards the ſhore, it is low and wet. On the north-weſt ſide, and paſſing by the village, there is a ſmall creek, bounded by high and dry meadows. On the oppoſite ſide of the creek, at the diſtance of from one fourth to a half mile, there are ſeveral pieces of wet ſwampy ground, generally dry in the ſummer ſeaſon."

In addition to what is here quoted, it is to be obſerved, that the creek on which Port-Elizabeth is ſituated, called *Manimuſking*, is a branch of Maurice River. This creek, ſome years ago, ran a north-weſterly courſe, and was navigable, many miles above the town, to wood-ſloops; but, within a few years, its courſe was obſtructed, at the place where the village ſtands, by the formation of a dam acroſs the tide. This circumſtance, which ſtill continues, has given riſe to the name *Dam*, by which the place is yet vulgarly denominated. The waters of this creek, as well as thoſe of Maurice River (even from the Delaware Bay, into which it empties, to the place where it ceaſes to flow), are, according to the united teſtimony of every perſon who lives in the country, generally muddy, except in a very dry time. The meadows on each ſide of the river and creek, eſpecially thoſe on the latter, are commonly drained by means of ditches cut through them, at the mouths of which are placed ſluice-gates,* which permit a quantity of water to enter ſufficient (nearly) to fill them at high tide, and, as the tide falls, ſuffer it to paſs out; by which

* The intention of thoſe gates is to prevent the paſſage of water through them into the meadows; but it ſo happens, that, from inattention, this is ſeldom carried into effect completely; as, at every tide, water, in conſiderable quantity, does make its way through them. This is more eſpecially to be remarked of thoſe on the ſouth, and in the vicinity of Port-Elizabeth.

proceſs the ditches are emptied at low water. That ſide of the creek on which the town ſtands, for two or more miles below it, the meadows are all banked, and not natural. It is about fifteen miles from the mouth of Maurice River to Port-Elizabeth.

Another circumſtance, which has not been mentioned, deſerves peculiar notice, as it was ſuppoſed, by ſome, to be the ſource of all the evil—I mean a moraſs on the north-weſt ſide of the tavern in which the firſt caſes of the diſeaſe occurred, as will be mentioned hereafter, about 120 paces from it. It was a low piece of ground, five poles long, and one or more wide, on which water ſtagnated, and vegetation commonly flouriſhed. A diſagreeable exhalation having been perceived to ariſe from this fen, before and after the diſeaſe made its appearance, it was determined among the people that it ſhould be cleared. Upon examination, the weeds which uſually grew in it were, for the moſt part, dead, and in an advanced ſtage of putrefaction; and the water which lay upon its ſurface was (to uſe their own expeſſion) *quite ropy*. From this filthy place the moſt reſpectable of the inhabitants of Port-Elizabeth derived the origin of their fatal diſeaſe.

The following are the ſymptoms of the diſeaſe, contained in the letter above mentioned, by Dr. Peirſon. "The diſeaſe commenced by chills and ſhivering, ſucceeded by an increaſe of heat, general pain, more eſpecially of the head, back, and breaſt: the pulſe more properly hard than full—more properly frequent than quick: a turgidneſs of the ſmall veſſels of the outer coat of the eye uniformly attended: the yellowneſs of the ſkin varied. In ſome caſes it was quite conſiderable from the commencement; in others ſcarcely diſcernable till a little before death; in others not till after death, when, in all caſes, it immediately took place to a very high degree. Vomiting, or nauſea, took place as the diſeaſe was more or leſs violent; and, in ſome inſtances, a lax attended. There was generally an abatement in the violence of the complaint in the morning, till about ten o'clock."

The diſeaſe began on the 9th day of Auguſt, 1798, at which time the yellow fever was ſcarcely epidemic in any part of the United States. On that day four perſons (three of whom lived in the ſame houſe—the tavern) were taken ill of a fever very nearly about the ſame time. William Larraſon, inn-keeper, Mary his wife, Levi Heaton, ſchool-maſter, and Abiah Cobb, ſervant maid, were their names. The three

firſt died, and the laſt recovered. William Larrafon died on the 12th Auguſt, Heaton on the 13th, and Mary Larrafon on the 15th of the ſame month.

The ſudden attack of diſeaſe on four people of the ſame dwelling, as it were (for I believe they were all ſeized in the tavern), and the mortality conſequent upon it, ſoon produced an alarm among the inhabitants of Port-Elizabeth.* Dr. Peirſon, who was their phyſician, found the diſeaſe under which they laboured "much reſembled the yellow fever," for he had ſeen it before. In order to account for its origin, about which he was much concerned, he made ſtrict inquiry whether there had been any intercourſe between Port-Elizabeth and any other place in which the yellow fever exiſted, and whether his patients had viſited people ſick of the ſame diſeaſe. Upon examination, "he found there had been communication with Philadelphia, both by land and water; but could find no inſtance of any perſons having been ſick on their paſſage (except the caſe of Perkins, mentioned below) to or from Philadelphia, or after their arrival at Port-Elizabeth." From all the information I received on this ſubject, which was diſcountenanced by no one, I am authorized to declare, that none of the four above-mentioned perſons had been from home for many weeks previous to their attack: and that they had not viſited a perſon ſick of the yellow fever in that year I know to be a fact. This circumſtance made Dr. Peirſon heſitate to pronounce his opinion on the nature of the diſeaſe, till after its fatal termination in two of his patients, when all doubts on the ſubject were removed, and his ſuſpicion of it being the yellow fever ſatisfactorily confirmed.

Having viſited Port-Elizabeth in the month of July of the preſent year, I was curious to inveſtigate the hiſtory of the diſeaſe. From my notes in this examination, I find the four perſons already named were the firſt patients in the diſeaſe. The ſtage which goes from Bridgeton to Cape-May, through Port-Elizabeth, being the only way in which they could have received the diſeaſe by land, I converſed with Mr. Hopkins (the proprietor and driver of it at that time) particularly on the ſubject, who informed me that he never carried a ſick perſon in his ſtage waggon before the 9th of Auguſt, and that, during the whole period of time in which the yellow fever

* In conſequence of this alarm, one half of the inhabitants fled from the village, and continued from home ſeveral weeks.

prevailed in Philadelphia, he carried but three paſſengers who had that diſeaſe; and none of theſe were conveyed as far as Port-Elizabeth. This being the only channel through which the diſeaſe could be conveyed, by land, to Port-Elizabeth, from any diſtant place, my next inquiries were directed to its importation by water. One Perkins, a ſhallopman, arrived at Port-Elizabeth, a few days before the 9th of Auguſt, from Philadelphia. He was in good health when he left this city, continued ſo on his paſſage, failed again in perfect health from Port-Elizabeth, after having enjoyed the ſame there, became ſick on the paſſage, and died before he arrived at Philadelphia. It was about ten days from the time he left Philadelphia until he ſailed from Port-Elizabeth on his return; which laſt mentioned place he left two or three days after the attack of Larraſon, &c. This was the only caſe I was able to find, which could create a ſuſpicion of the diſeaſe being imported. The people of Port-Elizabeth, however, did not believe that contagion was conveyed to them, either in the body, the clothes, or the veſſel, of this unfortunate man. So far from believing this to be the caſe, they conceived it more probable that he had received the ſeeds of the yellow fever among them, than that he brought them with him from Philadelphia.*

Ruth Peterſon was the next caſe of the diſeaſe which made its appearance in Port-Elizabeth. She was taken on the 10th of Auguſt, and died on the 17th following. She lived nearly a quarter of a mile ſouth-eaſt of the tavern in which Larraſon, &c. lay ill. She had no connection with any ſick perſon for ſome conſiderable time before, nor with any thing elſe from which ſhe could have got the diſeaſe by contagion.

The next caſe was that of Iſaac Marford, who was taken ill at the mouth of Maurice River, when on a fiſhing party from Port-Elizabeth, on the 15th of Auguſt, and died on the fifth day of his indiſpoſition, in extreme agony. He left Philadelphia exactly ten days previous to his attack, where he had been about one week. He ſailed down in a veſſel belonging to Milville (commonly called Maurice River Bridge), eight miles above Port-Elizabeth, where he landed. He was the

* Since this account was drawn out, I have been informed, by one of the inhabitants of Port-Elizabeth, that Perkins did not ſail from Philadelphia, but from a place, a few miles below Marcus-Hook, called Grubb's Landing. Be this as it may, however, you will, I am ſure, agree with me, that this man did not communicate the diſeaſe to Larraſon, &c.

only perſon who had been in Philadelphia of all who had the diſeaſe in Port-Elizabeth. The reſt had not even been from home for a conſiderable time before being ſeized with the diſeaſe.

Having thus given the hiſtory of the firſt ſix caſes, and, of courſe, gone far enough to account for the origin of the epidemic, it would be ſuperfluous to particularize any ſucceeding caſe: ſuffice it to ſay, there were, in all, thirteen genuine caſes of yellow fever in this little place,* ſix of whom died.

Before bringing this account to a concluſion, it is not unintereſting to obſerve, that along the courſe of Maurice River, from Milville to Lee's-Burgh, which is thirteen miles, caſes of yellow fever made their appearance. Theſe were in proportion to the number of inhabitants; and in no inſtance did a caſe occur at any great diſtance from the ſhore. The number of caſes which I have been able to collect, which occurred within this ſmall diſtrict, amounted to twenty-four (excluſive of thoſe at Port-Elizabeth), of whom ſixteen died, and eight recovered. A number of them took the diſeaſe in Philadelphia; and it is no leſs true, that a number owe it to local cauſes, and thoſe not of a contagious nature. One of the moſt remarkable of this number was that of Abigail Albertſon, aged ſix years, in whom the yellow fever was terminated by the black vomit, on the 9th day of September, having been ſick ſix days. She lived about two miles below Port-Elizabeth, and had not been there, nor at any other place from home, for more than eight weeks previous to her attack. Many of the family had been at Port-Elizabeth, &c. but none, except this child, became ſick during the whole autumn; and the only chance the child had of receiving the diſeaſe by contagion was in the following manner:—A man who came from Philadelphia in a ſloop, was taken ill after his arrival in the River Maurice; and, twenty-four hours after his attack, came upon deck, fell overboard, and was drowned; ſuppoſed, by the crew, to have been vertiginous. This accident happened one mile below Albertſon's. About five days after this, the body aroſe to the ſurface of the water, and floated up the river by Albertſon's houſe (which ſtands on the ſhore), and was ſoon after buried ſome diſtance above. The child (Abigail) was carried within eighty yards of this

* There were, at the time, nineteen dwelling houſes in Port-Elizabeth, and the number of the inhabitants amounted to ninety-ſeven.

drowned man before he was buried, when the wind was blowing directly from the child to the corpse; and, two days after, was taken ill of the disease of which she died. No physician saw the man, to determine the nature of his disease; but it is most probable it was the yellow fever. It is the unanimous opinion of the family, that the child did not catch the disease from any sick person (because she had seen none), nor from this dead body. This information I received from the parents of Abigail Albertson, as well as from many of their neighbours. I visited the place where the man was buried, &c. and trust to the facts mentioned.

I could adduce many other instances to prove the domestic origin of the yellow fever, as it prevailed in different parts of Cumberland county, besides what I have already related; but I will not trespass upon your time any longer. Permit me to observe, that I could not find a single instance, after all my inquiries, wherein the disease unequivocally proved itself contagious; and that, in Port-Elizabeth, the epidemic was checked about the latter end of September, by the *coldness* of the weather, *not* by the *wetness*.

All the facts that I have related, if it were necessary, could be substantiated upon the testimony of several respectable persons; and, as far as I have carried my inquiries, I have met with a coincidence of report not often to be found on the subject of malignant fevers. I can truly say, that in no material point have any of my informants disagreed; and I hope I am too sensible of the value of just statements in the establishment of truth, to render a false report, in order to give weight to any particular opinion. Viewing, therefore, the facts which I herein transmit you, with that candour which ought to arise on the subject, it certainly is no more than just to observe, that this fever took its rise from domestic causes; and when we consider that no person in Port-Elizabeth and its vicinity believes otherwise than that it had a local origin,* we must attribute its generation, if not its continuance, to this source. The cases were few indeed, when compared with those which have taken place in Philadelphia and other places; but, then, their number was much superior in proportion to the number of inhabitants; and they are of the very first importance, in as much as the facts stand undoubted.

* It is a curious circumstance that I could not discover a dissenting voice from this opinion.

It is much to be regretted, that, in every department of ſcience, the human mind, in endeavouring to explain the various phenomena of nature, too quickly imbibes the prejudice and ſuperſtition of the world, and too often graſps at weak and inſignificant holds to ſupport its folly. This is more eſpecially the caſe in the ſcience of medicine; and had I no other proof of the truth of this poſition than the following anecdote, it would be ſufficient to eſtabliſh it to my conviction. After many fruitleſs attempts to account for the firſt caſes of malignant fever which occurred in Port-Elizabeth from a diſtant ſource, no better method could be deviſed to explain its origin in this way, than by attributing it to handling ſome loaf-ſugar which had been conveyed to them by the ſtage from Philadelphia. Whether it is poſſible that loaf-ſugar can infect a perſon with a malignant bilious fever, after having been carried no leſs than ſixty miles, I muſt leave you to determine.

I am, reſpectfully,
Your obliged friend,
GEORGE LEE.

Pennſylvania Hoſpital (Philadelphia), Aug. 29, 1799.

ARTICLE VI.

ON CRYSTALLIZATION.

To the EDITORS *of the* MEDICAL REPOSITORY.

Gentlemen,

THERE are, perhaps, no phenomena in nature which have cauſed more wonder and admiration, and, at the ſame time, more completely ſet all attempts to inveſtigate their cauſes at defiance, than thoſe of cryſtallization. That the ſame ſubſtance ſhould, when left to depoſit itſelf regularly from a ſtate of ſolution, almoſt always put on the ſame form, and that the forms thus aſſumed ſhould be ſo various, and yet ſo regular and appropriate, has excited the admiration of

philoſophers ſo highly, that ſome have not even heſitated to aſcribe life to them.

Many attempts have been lately made to inveſtigate the true foundations on which this curious law of nature reſts, but, I fear, with little ſucceſs. *Certain polarities* have been aſcribed to the particles of which cryſtals are compoſed: thus, by *certain attractions and repulſions*, when they are left to move freely in a fluid, *certain ſubſtances* aſſume *certain forms*—which is juſt as much as to ſay *we know nothing about it.** Newton was the firſt who advanced the ſuppoſition of its being cauſed by the figures of the *ultimate particles* of bodies and their different arrangements. Romme de Liſle has written a large treatiſe on the ſubject, in which he endeavours to diſtinguiſh, in the cryſtals of all analogous or identical ſubſtances, the ſimple modifications of a primitive form. The Abbe de Hauy has endeavoured to go ſtill further. He has not only adopted the conjecture of Newton relative to the forms of cryſtals depending on thoſe of the *ultimate particles*, but has endeavoured to determine what theſe forms are. He has attempted to reduce them to ſix. 1. The parallelopipedon in general, comprehending the cube, the rhomboid, and all ſided ſolids, when oppoſite ſides are parallel. 2. The regular tetrahedron. 3. The octahedron, with triangular ſides. 4. The hexagonal priſm. 5. The dodecahedron, bounded by rhombs. 6. The dodecahedron, bounded by iſoceles triangles.† I ſhall not here enter on the conſideration of the various modes in which he combines theſe primitive forms, to produce all the variety of cryſtals nature preſents to us. All that I mean to do is to ſhew that many very regular forms are produced by cryſtallization, without being the reſult of any regular formed particles. If I can do this, I ſhall conſider it as a refutation of his theory: for if it can be proved, that by the union of particles, without any determinate

* In the laſt volume of the Iriſh Tranſactions there is a poſthumous paper of Mr. Kirwan's, in which he aſſumes this doctrine, and, by it, attempts to account for magnetiſm. It is well worth reading, as a happy illuſtration of the length to which hypotheſis may be carried.

† I have never read either the writings of de Liſle or de Hauy: if, therefore, there is here any miſrepreſentation of their theories, it is chargeable alone to thoſe writers from whom I have collected them. I am perſuaded, however, from the corroborating repreſentation of ſeveral writers, that this muſt be a tolerably faithful account of their theories: if not, my objections will ſtand againſt the theories promulgated by the different authors in their names.

form, regular cryſtals are ſometimes produced, I cannot ſee the propriety of ſuppoſing the particles of which cryſtals are formed to have certain and determinate forms; for it is nothing more than a ſuppoſition, made for the purpoſe of explaining the regular forms of cryſtals. Mr. Hauy, it is true, *diſſected*, with conſiderable accuracy, as far as ſuch *diſſections* could be carried, cryſtals of carbonate of lime, and many others which break into regular forms, and determined what were the forms of the leaſt of the regular figured particles he could procure. But what is to convince us that they were not themſelves formed of *amorphous* particles, eſpecially if I can ſhew that regular forms may be produced by the union of ſuch particles?

Cryſtallized granites are not, as far as I can learn, common in Europe; but in this country they are very common, eſpecially ſecondary granites. I have ſcarcely ever ſeen a conſiderable quantity of theſe without obſerving either regular cryſtals among them, or an evident tendency to cryſtallize. Theſe cryſtals are often found very regular. I have ſome by me, which I brought from the Cahnawaga ridge, which are as regularly cryſtallized as any baſaltes I ever ſaw.* Theſe cryſtals, in my opinion, totally deſtroy the theory of de Hauy. They are compoſed of the moſt heterogeneous and *amorphous* particles, and yet are of a very regular figure.† The following are the appearances which ſeveral of them, from different places, preſented.

I broke a number of rhomboidal cryſtals of granite, which I found within a few miles of Philadelphia. They abound in the neighbourhood of this city. They all appeared to be ſecondary granites, compoſed of quartz, mica, and felſpar. I examined the fracture with a microſcope, and all the particles appeared *amorphous*.‡

A tetrahedral cryſtal of granite, from the little falls of Po-

* How are theſe cryſtallizations effected? Evidently not by ſolution; and the grains are ſo large as not to admit of being long ſuſpended in water.

† This certainly will not be replied to by ſaying, that though the *grains* of which theſe granites are compoſed are *amorphous*, yet the ultimate particles are regularly formed, as the form of the cryſtal cannot depend on the form of theſe particles, but on that of the *grains*, if it depended on the form of its conſtituent principles.

‡ In the granite rocks, in this neighbourhood, the mica is often found cryſtallized as well as the felſpar, which is very beautifully cryſtallized. But I have never ſeen either of theſe, in any cryſtals of granite, ſhewing any ſigns of cryſtallization.

towmack, appeared to be compoſed of mica, quartz, and felſpar; the mica being by far in the greateſt proportion. The mica was in ſmall plates, but without any certain arrangement. The quartz and felſpar were *amorphous*. The ſides and angles of this cryſtal were well *defined*, but no two of the ſides were parallel.

A very regular cryſtal, from the Cahnawaga ridge, in the form of a rhomboidal priſm, appeared to be compoſed of quartz, felſpar, mica and hornblend; all which particles are amorphous.

Here, then, are cryſtals formed by the aggregation of the moſt diſcordant forms. Why then ſhould we admit the bold conjecture of all the particles of any cryſtal being ſimilar in form? I have examined, with a microſcope, the fractures of coarſe grained cryſtallized baſaltes, but could diſcover nothing in them like regular formed *particles*; and yet the aggregation was of a regular form. I ſhall here ſay nothing of the difficulty of ſuppoſing, that ſubſtances, whoſe ultimate particles, even according to de Hauy's theory, muſt be ſo different as thoſe of ſilex, magneſia, argill, and iron, ſhould unite into regular figures by the neceſſary union of their ſides.

Theſe are a few of the facts which have induced me to differ from Mr. de Hauy. It would be of but little conſequence to prove his theory falſe, if it ſtood perfectly inſulated, as at firſt view it would appear to do, from all other parts of ſcience. But this never can be the caſe with any propoſition. There is none, however abſtract or inſulated it may at firſt appear, but, at ſome time or other, becomes connected with ſome parts of ſcience, and, according to its truth or falſehood, is uſeful or detrimental. Attempts have been made to explain the whole doctrine of affinities from theſe ſuppoſed forms of the ultimate particles. Sulphuric acid and the vegetable alkali have a ſtronger affinity for each other than nitrous acid and vegetable alkali have, becauſe their ultimate particles are of ſuch forms as to preſent larger ſurfaces to each other: nay, they have even carried hypotheſis ſo far as to propoſe to calculate the ratios of affinity by the ſuppoſed relative ſurfaces the ultimate particles of different ſurfaces preſent to each other. How careful, then, ſhould we be in admitting any hypotheſis, however unimportant it may at firſt view appear, without the ſtricteſt examination! The arguments of Mr. de Hauy, in ſupport of his theory of cryſtallization, from which ſuch im-

portant deductions are attempted to be drawn, appear to me to prove nothing more than that, if he had cryſtals to conſtruct, that is the way he would chooſe to make them.

I remain, Gentlemen,
With eſteem, yours, &c.
THOMAS P. SMITH.

Philadelphia, Auguſt 16, 1799.

ARTICLE VII.

SEPTIC (Nitric) ACID *the Cauſe of the Mortality among the Neat Cattle and Horſes of Canada, during their Stabling in Winter: In a Letter from Mr.* BLANCHET *to Dr.* FISHER, *Surgeon of the Garriſon of Quebec, and Member of the Houſe of Aſſembly in Lower-Canada, dated. Eſſex County, (N. J.) July* 30, 1799.

SIR,

AS we cannot extend too far the ſphere of our ideas upon ſubjects of utility, and as it may always be of public advantage to apply principles which we know, to the explanation of natural phenomena, for the purpoſe of mitigating or preventing the evils which afflict us, I have determined to offer you the reſult of my reflections on that mortal peſtilence which rages among our cattle in Canada during the winter, and cauſes a great deal of loſs and diſtreſs among many of our reſpectable inhabitants on the approach of ſpring.

Every body knows that few winters paſs wherein a number of our farmers do not loſe, before the termination of the ſpring, more or leſs of their live ſtock. There are even ſome families who have been entirely ruined in this way; and others who have loſt, in the courſe of one winter, their whole herd of cattle.

Superſtition and conjecture have been vainly employed in ſeeking remedies for ſuch ſerious calamities. Far from inveſtigating the cauſe of theſe afflicting accidents, in the places where they aroſe, it has been cuſtomary with the people to aſcribe them to the ridiculous or impoſſible workings of ſorcery and witchcraft. Very different, indeed, Sir, from this

are the regularity and ſimplicity of nature. Such wanderings of the underſtanding will never be able to afford a remedy againſt theſe diſaſters.

The cauſe of the epizootic diſtemper to which I allude, that happens during the wintering of our cattle, will appear plain from a conſideration of the following circumſtances:—The people of Lower-Canada, expoſed to a long and rigorous winter, are obliged to erect ſtables, to guard againſt the inclemency of their frozen climate. With the view either of ſaving trouble or expenſe, they generally leave their ſtables without pavements. This neglect has led on to another of a more ſerious kind: for they have been thereby induced to neglect the removal of the dung and other excrements of the beaſts from the ſtable, during the whole winter. This collection of excrementitious matter forms, before ſpring is ended, a bed one foot and a half, or two feet in thickneſs. A ſtable of this ſort has commonly no other opening than the door, which is always kept ſhut during the night, and very commonly alſo during the day. Here, in ſhort, is every thing neceſſary to engender the moſt virulent peſtilence, of a malignity ſufficient to deſtroy the whole flock in a ſhort time.

For this dung-heap has no ſooner acquired a certain thickneſs, than, under the moiſtening effect of the urine, the maſs neceſſarily heats, and undergoes gradual decompoſition. But as *ſepton* (azote) and *phoſphorus* are the principal active ingredients in this mixture of materials, it is preſumeable, that carbonic, *ſeptic*, and *phoſphoric* acids, are the moſt copious of the new products. I have, indeed, myſelf ſeen, in the different layers of theſe dung-heaps, depoſitions of the ſeptite of pot-aſh or nitre.

Independent of this, it is remarked that horned cattle, tied at the further end of a ſtable, are more ſeverely affected by the poiſon than thoſe which are faſtened near the door. And it has likewiſe been obſerved, that on bringing the creatures from the remote part of the ſtable, which were generally the moſt lean, and giving them a ſtand near the door, they have quickly recruited, and become more lively.

I am of opinion too, Sir, that the diſtemper known among our horſes in the winter time, under the name of *torticoli*, or *ſtaggers*, proceeds from the operation of a *ſimilar poiſon*. For if care is not taken to change the ſtable, or place where the horſe is kept, he dies; and if he is removed to a more clean and wholeſome ſtable, he almoſt always recovers. The

diſeaſe in their heels, called the *ſcratches*, evidently ariſes from the operation of the ſeptic acid of the dung in which their feet are bemired. From this it is natural to ſuppoſe that the polluted and infected air to which theſe animals are expoſed, at leaſt five or ſix months of the year, would affect their growth, and have a tendency to diminiſh the breed. This cauſe, which has eſcaped the notice of naturaliſts, is deſerving of conſideration; for it does not appear probable to me, that *cold and moiſture*, as the Count de Buffon and M. de Pauw have obſerved, are the cauſe of the degeneration of our neat cattle and horſes in Canada; but it ſeems evident that the diminution of their ſize is partly to be aſcribed to the manner in which they are wintered. It has been obſerved, too, that oxen and cows fat better when kept on a pavement than in the mire of their own excrements.

Thus, you ſee, every thing concurs to prove that epizootic diſtempers in Canada, ſuch as I have deſcribed among our neat cattle and horſes, are produced by vapours of the ſeptic (nitric) acid, which are engendered and extricated during the putrefaction of the dung, and other filthy ſubſtances collected in the ſtables. You will remark, however, that the explanation now given does not include the mortality among domeſtic animals, from a want of food, which, when it befals them, as well as the human ſpecies, is referable to quite a different cauſe, as I hope, at ſome future time, to ſtate to you.

From what has been ſtated concerning the diſtemper of animals in Canada, I feel myſelf inclined to offer a reflection or two on the miſeries and calamities ſuffered by the ancient inhabitants of Egypt. It may, perhaps, be poſſible to reconcile to phyſical cauſes certain miracles related by the ſacred hiſtorian, if human underſtanding might be permitted to fathom their depth. Among the plagues of that region, mentioned in Geneſis, it is eaſy to comprehend how, by means of the *ſeptic* (nitric) *acid*, which has always been conſiderably prevalent in that portion of atmoſphere, the *mortality among their animals* was brought about, as well as the *ſores* which afflicted both man and beaſt, and the *viſitation by hail*. There is ſuch a connection between theſe phenomena, as has been obſerved, even in our own times, during the volcanic eruption in Iceland, deſcribed by Mr. Holm,* that one could readily give up the miracles to the dominion of nature alone,

* See Mitchill's Theory of Hail, Med. Repoſ. vol. iii. p. 81 & ſeq.

if there was not aſſurance of their being derived from a higher authority.

Be theſe things as they may, it is certain the Egyptians have ſuffered, and ſuffer ſtill, certain plagues, which are inſeparable from their climate and local circumſtances. The annual overflowing of the river Nile, which is a ſource both of beauty and wealth to the country, depoſits on its banks a variety of ſubſtances ſuſceptible of putrefaction. Theſe being left by the water, which retires to its channel, are expoſed to the drying and ſcorching rays of the ſun, by which they are decompoſed, and converted, as far as their conſtituent particles permit, into ſeptic (nitric) acid. The quantity of nitre which is found there proves that its atmoſphere abounds, more or leſs, with this acid. Pliny mentions that nitre is found in this country. After having given an account of its natural production in Macedonia, he writes thus: "In Ægypto autem conficitur multo abundantius, ſed deterius, nam fuſcum lapidoſumque eſt; fit penè eodem modo quo ſal: niſi quod ſalinis mare infundunt, Nilum autem nitrariis." And although d'Anville, Sicard, and Volney, inform us that the nitre of Pliny is what is now-a-days called mineral alkali, or ſoda, there are, nevertheleſs, ſeveral ſubſtantial reaſons to convince me, that there is formed ſpontaneouſly, in Egypt as well as in India, a prodigious quantity of nitre, in the modern ſenſe of the word. It may hence be preſumed, that without the preſence of an alkali in the ſoil, to counterbalance the activity of the ſeptic acid engendered there, this beautiful country would, in ſome parts, be too unhealthy to live in.

But, as the quantity of ſeptic acid in the atmoſphere ought to vary according to circumſtances, the alkali, whether potaſh or ſoda, ought ſometimes to be too ſcanty to attract or abſorb the whole of its virulence: conſequently, the ſurpluſage of this deſtructive agent, in ſuch caſes, will act upon the ſurrounding objects—men, for example, and domeſtic animals ſometimes—and cauſe deſtroying plagues among them: for, if in the ſtables of Canada a ſimilar poiſon can cut off, in a ſhort time, a farmer's whole ſtock of creatures, what may we not ſuppoſe it capable of doing in a climate where peſtilential and ſeptic vapours are among its moſt plentiful productions? All the animals forced to live and breathe in ſuch an atmoſphere, may be expected either to be killed immediately, or be deſtroyed by ſlow degrees, when the poiſon is not ſufficient to extinguiſh their lives at once.

Yet, upon the ſuppoſition that the plagues of Egypt, as recorded in holy writ, are ſuſceptible of the explanation and interpretation herein attempted, how, it may be aſked, did the people of Iſrael, who dwelt in the land of Goſhen, eſcape? This queſtion may be anſwered by aſſigning the ſame reaſon by which we explain the almoſt entire immunity of the inhabitants of Syracuſe from the peſtilence that almoſt deſtroyed the Carthaginian and Roman armies, by which they were cloſely beſieged. The poſition of the town was more dry and elevated than its marſhy neighbourhood, where the armies of the beſiegers were encamped;* in like manner as the yellow fever has repeatedly ravaged the cities of New-York and Philadelphia, without attacking or infeſting the country places in their vicinity. In the ſame way the land of Goſhen may be conceived to have been ſheltered from the plague of Egypt, on account of its ſituation to the eaſt of the Nile, where the land is naturally both higher and drier. I do not, however, by any means, pretend to queſtion the correctneſs of Moſaic hiſtory. The ſtudy of nature is not likely to claſh with true theology.

Having thus ſhewn the analogy which exiſts between the peſtilence, during the wintering of cattle, in ſtables in Canada, and the plagues of Egypt, I ſhall next offer a few ſentiments on the means neceſſary to prevent the waſte of this diſmal diſtemper.

1. All ſtables, and other buildings for ſheltering theſe domeſtic animals during winter, ought to have paved floors; and, in order to neutralize the ſeptic acid, the pavement ſhould be of lime-ſtone, or ſome other *calcareous* material.

2. The proprietors ought to be careful in removing regularly the dung which is dropped; ſo that the ſtables may not abound with the ſubſtances whence ſeptic acid is formed.

3. To preſerve a proper ſyſtem of cleanlineſs; and, for more effectually accompliſhing this, to provide a ſufficient number of windows or openings, to let out foul vapours and to let in pure air.

4. To white-waſh, with lime, the inſide of the ſtables, two or three times during the winter, eſpecially during the months of March and April.

Experience has taught the inhabitants of Holland the neceſſity of guarding againſt peſtilential diſtempers among their cat-

* Rollin's Ancient Hiſtory, vol. i.

tle. Their ſtables are paved, and frequently cleanſed with water and ſoap. This latter ſubſtance being but a combination of oil with an alkali, is a proper material to neutralize the acid of putrefaction. Since Dr. Mitchill explained the manner in which ſoap neutralizes and deſtroys the putreſcent ſubſtances which are produced in the clothing and habitations of men, there can be no doubt of its efficacy in cleanſing cow-houſes and horſe-ſtables upon the ſame principles.

Such are the advantages we may now derive from chemiſtry; that ſcience which, though under-rated and miſunderſtood in its infancy, is faſt acquiring, in a more enlightened age, a proper degree of importance and influence. Guided by its illuminating torch, the human underſtanding diſcovers, with aſtoniſhment, the moſt hidden ſecrets of nature. And, in proportion as chemiſtry ſhall be cultivated, will it ſhed a luſtre over all the different branches of phyſical ſcience.

With great reſpect, &c.

F. BLANCHET.

ARTICLE VIII.

THEORY OF EXPLOSIONS.

An Induction of certain Facts, which tend to prove that the burſting of Veſſels containing Water, in freezing, is owing to the Extrication of Atmoſpherical Air; that the ſudden Expanſion of Air lodged in the Pores of Trees, by means of Lightning, is the Cauſe of the violent ſhivering of their Parts; and that Volcanic Exploſions and Earthquakes derive their Origin from the ſame Cauſe: Communicated in a Letter from Mr. BLANCHET *to Dr.* MITCHILL, *Profeſſor of Chemiſtry, Natural Hiſtory and Agriculture in Columbia College, in the State of New-York.*

THE cauſe of exploſions, in general, which, at firſt view, appears to be ſimple and eaſy to comprehend, is, nevertheleſs, beſet with many difficulties; and it is with much reluctance that I have ventured to diſcuſs this ſubject.

In order to avoid a tireſome recital, I ſhall decline to ſtate the opinions of philoſophers upon this ſubject. My deſign is to explain the immediate cauſe of certain phenomena, which ſeem hitherto to have eluded their reſearch. The phenomena which ſeem to be exceptions from general principles, becauſe they are preſented under an irregular and peculiar form, are included in the following queſtions:—What is the immediate cauſe of the burſting of veſſels containing water in the ſtate of congelation? In what manner does lightning rend and ſhiver a tree into ſo many pieces? Whence ariſe volcanic exploſions and earthquakes? Theſe inquiries form the ſubject of my letter.

As to the immediate cauſe of the burſting of veſſels filled with congealing water, the celebrated Dr. Black, according to the obſervation of Dr. Dickſon (ſee Medical Repoſitory, vol. iii. p. 35), ſeems, in ſome degree, to have underſtood it, when he ſuppoſes, "that in the moment of the converſion of water into ice, the latent heat of the water, then ſet at liberty, enters into the air which is contiguous to its ſurface, or combined with the water, and dilates it with ſuch force that it produces a ſeparation of the ice into an irregular form, and a burſting of the containing and reſiſting veſſels." But this explanation, however ingenious, is not entirely ſatisfactory. Beſides the caloric extricated from freezing water, which may dilate the air combined with it, there is another agent which eſcaped Dr. Black's attention; that is, the ſudden detachment of atmoſpheric air which is found lodged in the interſtices of the particles of the water.

The moſt ſimple principles of natural knowledge teach us that atmoſpheric air cannot paſs from its permanently aëriform ſtate to that of fluid or ſolid, by any degree of cold with which we are acquainted. Admitting this to be true, there is no longer any ground of ſurprize in ſeeing the burſting of bodies which reſiſt the force of freezing water. The air, a fluid of permanent elaſticity, being compreſſed, and forced to give way to the particles of water, which cold, or the attractive power of the atoms of bodies, draws violently together, it follows that the ice, into which the water is converted, muſt break aſunder, in order to afford a paſſage to this aëriform ſubſtance, which cold can neither condenſe nor make ſolid, and muſt rend and ſhiver, with a cracking noiſe, the veſſels no longer able to hold it.

This theory is rendered probable, and ſtrengthened, by a

fact which I have obſerved myſelf, viz. that the fats, ſuch as hog's fat, &c. ſettle conſiderably down in the veſſels in which they are condenſed. I have alſo noticed cavities in the interior parts of ſuch maſſes of fat. Now, this ſhrinking of volume, and theſe cavities in fat, undoubtedly, can only ariſe from the extrication of atmoſpheric air in the proceſs of condenſation. Independently of this fact, which every body is ready to atteſt, there is not a Canadian peaſant who is ignorant that the cavities found in a maſs of ice were formed by air, and contain it. Theſe facts, therefore, prove that, in the congelation of water, the atmoſpheric air which exiſts in the interſtices of the particles of water is forced to detach, or ſet itſelf at liberty, as ſoon as cold converts them into ice.

On this principle it is eaſy to explain the rending and ſplitting of trees, with a cracking noiſe, during the froſts of winter—the burſting of ſtones in the moment of the converſion of the water contained in them into ice—and the breaking, as well as the loſs of the primitive perpendicularity of walls which had been built during the autumnal ſeaſon.

According to the Academy *Del Cimento*, it appears to be demonſtratively true, that frozen water occupies more bulk than fluid water. This opinion ſeems to claſh with all fact and analogy: for we conſider it as aſcertained, that the ſpecific gravity of ice is greater than that of water—that is to ſay, that a cubic foot of frozen water contains more watery particles than a cubic foot of fluid water, ſince, in the former caſe, the particles are undeniably more cloſely approximated and compreſſed than in the latter. Now, is it poſſible that frozen water, whoſe particles have been condenſed, occupies more ſpace than water in the ſtate of fluidity? I have often ſeen water freezing in open veſſels, ſuch as the copper veſſels of kitchens, &c. and I have always remarked, towards the middle of the veſſel, a riſing, divided by chinks, which, doubtleſs, had been formed by the eſcape of atmoſpheric air, during the congelation of the water. It is this phenomenon which has probably led to a wrong concluſion. Beſides, the hog's fat, which, like water, becomes ſolid by cold, or by the abſence of caloric, is diminiſhed in bulk by condenſation; and, if the air which eſcapes in this proceſs produce no burſting, it is becauſe the fat is always ſet to cool in open veſſels. Upon what ground, then, could an exception be made to the general law? But I now come to explain the effect produced by lightning, when it ſtrikes a tree, &c.

No perſon, ſo far as I know, ſeems yet to have accounted for the ſhattering of trees by the ſtroke of lightning. A moment's reflection, however, ſuffices to diſcover and explain the cauſe. As it is only by a careful analyſis of facts that we can deduce juſt concluſions, I procced to examine what happens in the moment of the lightning ſtriking a tree, and it will be ſeen whether this ladder will enable us to reach to the cauſe of this phenomenon.

Since the beautiful experiments of Lavoiſier, of Fourcroy, &c. have demonſtrated that caloric is the cauſe of the repulſive power of the atoms of bodies, there is no doubt that the more the atoms of a body are removed from one another, the greater is the capacity of ſuch a body to contain caloric, or the more caloric it contains. It is alſo inconteſtibly proved, that the bodies which are conſtantly in the ſtate of gas, in the common temperature of the atmoſphere, contain a great quantity of caloric, and in proportion to their ſpecific capacity for holding it. So likewiſe the electric fluid, or what might, with more propriety, be called the electric gas, muſt contain a prodigious quantity of caloric, ſince this element always exiſts in the ſtate of gas, and the more this gas is accumulated, the more the amount of ſpecific heat muſt alſo be augmented.

This being premiſed, whenever the lightning (which is only an accumulation of electric gas, diſcharged from one cloud to paſs to another containing a leſs quantity) happens, in its courſe, to ſtrike a tree, &c. the tree becomes ſo ſuddenly overcharged with caloric, that the air and other conſtituent parts of it, which are diſpoſed rapidly to combine with heat, undergo expanſion, and thereby ſhiver the tree, in order to force a paſſage, and to ſet themſelves at liberty. I cannot compare this phenomenon to any thing better than to the diſcharge of a cannon or of a muſket; for every body knows that the diſcharge of a cannon is owing to the ſudden expanſion of the conſtituent parts of the powder by the introduction of caloric.

In like manner, I have every reaſon to believe that the violent rending of a tree, by lightning or the electric gas, is owing to a ſimilar cauſe, that is, a ſudden accumulation of caloric, which expands, with violence, the air, &c. lodged in the interſtices of that body. This opinion will be readily embraced, if it be conſidered that the electric gas melts the metals. If, indeed, the metals be ſuddenly melted by this gas, or rather by the caloric which it contains, is it not thereby de-

monſtrated that ſuch a degree of heat is ſufficient immediately to ſet fire to all combuſtible* bodies, and ſo far to expand the air contained in the tree as to cauſe the rending of its parts?

If animals which are killed by a ſtroke of lightning, or by the accumulation of the electric gas, receive no apparent injury, ſuch as laceration of their parts, as in the caſe of the tree, their death muſt be owing to a decompoſition produced in their bodies. This opinion, which has never been attended to, ſhall be fully developed and diſcuſſed in another work. I proceed, therefore, to the third part of my ſubject; to wit, to inquire concerning the immediate cauſe of the eruption of volcanoes and of earthquakes.

Whatever may be the agent which kindles and inflames volcanic ſubſtances, whether it be the electric gas which communicates its fire to thoſe moſt inflammable ſubſtances, ſuch as ſulphur, &c. or whether it be the ſubterranean heat, which, in making its eſcape, ſets fire to thoſe ſubſtances—ſtill it is certain that atmoſpheric air muſt be found in great quantities in the interior of volcanoes. For ſince the ever memorable diſcoveries of Lavoiſier, of Prieſtley, of Scheele, and of Ingenhouſz, on combuſtion, it is admitted as a demonſtrable truth, that the burning of combuſtible ſubſtances is owing to oxygen, that is to ſay, it is fixed and abſorbed by the body in combuſtion, while the caloric and the light which are combined with it, eſcapé in order to form the flame, the light and the heat. In this manner atmoſpheric air is one of the eſſential agents in ſupporting the fire of a volcano.

Theſe things being premiſed, as ſoon as a volcano is kindled and ſet on fire, the atmoſpheric air which feeds it, as well as the baſes of ſulphur, of water, &c. which are alſo converted to the ſtate of gaſes, by the evolution or accumulation of heat, are expanded, and break out with a violence and impetuoſity not to be reſtrained by the force of oppoſing bodies, and thereby give birth to earthquakes, &c.

This theory is remarkably countenanced by the common and uniform ſeries of occurrences which follows the eruption of a volcano. In the firſt place, as ſoon as it is kindled, there appears a thick ſmoke; ſoon after, when the air, &c. become expanded, ſtones of enormous bulk are thrown out to great

* The experiment of Meſſrs. Lavoiſier and Meunier, in which they cauſed an electric ſpark to paſs through a balloon which contained oxygen and hydrogen, to produce combuſtion in order to form water, proves how large a quantity of caloric is contained in the electric gas.

diſtances into the aërial regions, accompanied with earthquake, and agitation of all the ſurrounding country. As ſoon as the ſuperfluous air is diſcharged and ſet free, there ſucceeds a bright flame, which ſeems to reſtore ſerenity to the abyſs, which again, after a ſhort time, vomits forth a ſhower of fiery and deſtructive matters.

To recapitulate—1. The burſting of veſſels in the freezing of water is owing to the eſcape of atmoſpherical air, which alſo ſeparates the ice into irregular maſſes. Nothing is more improbable than the expanſion or increaſed repellency of the particles of water in the proceſs of congelation. This gives an anſwer to the queſtion of Dr. Dickſon (ſee Med. Repoſ. vol. iii. p. 34). 2. The ſhivering of a tree by lightning is cauſed by heat expanding the air, &c. which it contains. 3. The eruption of volcanoes and earthquakes is likewiſe produced by expanſion of air. In a word, every exploſion is owing to the ſudden extrication of ſome matter incapable of confinement, or to the expanſion of air in a reſiſting body.

I am, with much eſteem and conſideration,

Sir,

Your moſt humble ſervant,

F. BLANCHET.

Eſſex County (N. J.), Aug. 15, 1799.

ARTICLE IX.

Brief Remarks on the Origin of the Yellow Fever in ſome Parts of the State of Rhode-Iſland, drawn up by MOSES BROWN, *Eſq. of Providence.*

THERE are ſome reaſons to apprehend that the Briſtol fever of 1797, though confidently ſaid, by ſome, to have been imported, was generated there; or, if brought in the ſhip Waſhington, was generated on board. I have taken ſome pains to inveſtigate it, have examined the log-book and journal, and converſed with the keeper, a reſpectable young man on board during the voyage. The ſhip Waſhington, William Snell, maſter, ſailed from Briſtol to Savannah, in Georgia; from thence ſhe ſailed, on the 19th of 7th month

(July), for New-York, where ſhe arrived on the 9th of 8th month (Auguſt), after 21 days paſſage, with a cargo of rice and tobacco. She was viſited by Dr. Bayley, the Health-Officer; ſailed on the 13th for Briſtol, and arrived on the 15th; had been ſo leaky during her paſſage from Georgia as to require 200 ſtrokes of the pump every hour to free her. The crew ſay the yellow fever was not, as they heard of, there during the time of the ſhip lying at Savannah. The captain and mate took the fever and ague before they came out, and brought it home with them. A young man who ran away from a New-York ſhip (the Elizabeth), which had no perſon ſick on board, took refuge in the Waſhington, and ſhe being in want of hands encouraged him to ſtay. He was ſecreted in one of her ſtate-room lockers a number of hours, and came out, ſweating profuſely, in the evening: he took cold by lying on deck the night he began to complain, and died the 5th of 8th month (Auguſt) ſeventeen days after ſailing. Another of the hands was ſick when they got to New-York, and was taken to the Hoſpital, by the advice of Dr. Bayley, as having eryſipelas. He died about thirteen days after. Another was taken, labouring in the hold, on the 13th, in unloading at Hellgate. He came to Warren, and died in his father's family on the 20th. Another young man (Bradford) was taken ill, labouring in Briſtol harbour to get the ſhip off the ground, and lay ſick at his father's houſe, a mile out of town, but recovered. None of theſe two families, nor any other perſon, took the fever; nor was it communicated from the waſhing of the clothes of any of the people who came home. Hence it would ſeem, if theſe had the yellow fever, it was not contagious, either from them or their clothes. It was ſaid to have been taken from ſome light ſails which the ſail-maker took from the veſſel. The crew ſay theſe ſails were daily hoiſted, were wet and dried again, after the ſhip left New-York. It ſeems unlikely that theſe ſails (never, as they ſay, lain on by the ſick) ſhould communicate the diſeaſe, while the very clothes and bodies of the ſick who came home in her did not, though attended by all their friends, without fear or ſuſpicion of contagion. It was alſo ſuggeſted that the ſhip's bilge-water gave the neighbours the fever; but her leaking muſt have prevented much collection of filth; and thoſe who ſaw her pumped told me the water was white, like ſea-water, ſhe leaked ſo much: and though the ſubject is too lengthy for diſcuſſion here, I add, there are ſome of the moſt judicious people in that town

conſider the fever (of which eighteen died and one recovered) to have originated in Briſtol, while others ſay it was imported in the ſhip above-mentioned: ſo nothing can be abſolutely determined by the opinions there, further than as to its contagiouſneſs, if thoſe I mention had it, whoſe families had it not.

Of the firſt nine who died in Briſtol, there were none communicated it to any others; but the perſon who recovered is ſaid to have given it to a native, or very long reſident black woman, who watched with him. She, however, had it, and died; by which many conſidered it to have been contagious: yet ſhe might have taken it from the ſame ſource as others there did; for the next women who had it, and who died on the 1ſt of 10th month (October), is ſaid to have been no where to take it. Many were on board this ſhip at Briſtol, and unloaded her, but have not had the yellow fever. Two that worked on board have had a bilious fever ſimilar to that of the young man, my informant, and recovered, though only one out of eighteen who had the yellow fever in town ſurvived; by which it appears that the fever taken by fatigue on board was much more favourable than that of the people in town, who could give no account how or where they got it, which ſhews a bad ſtate of the air, and is thus accounted for:—They raiſe large quantities of vegetable roots, as onions, beets, parſnips, &c. and collect large heaps of manure. In that year, near where the fever commenced, there was a large and very offenſive pile of putrid fiſh and other matters heaped up to rot for manure; and an offenſive old diſtillery, that had not been wrought for a number of years, at the ſame wharf where the ſhip lay; from whence, it is probable, the ſmell proceeded that was attributed to the bilge-water, which, as the ſhip, though light, leaked much, could not ſmell ſo offenſively.

The mortality in this town, for the years 1795, 1796, and 1797, ought to excite the inhabitants to more attention in inveſtigating the cauſe, and, if poſſible, to remove it: for its natural ſituation one would ſuppoſe to be as healthy as that of any town in the State.

I find, by a liſt of individuals, kept by a perſon of obſervation there, Daniel Bradford, Eſq. whoſe ſon was my informant before mentioned, and whoſe journal I examined at his father's houſe, that forty-eight perſons died in 1795, ſixty-three in 1796; and from the 7th of 1ſt month (January) to the 27th

of 10th month (October), inclusive, being only nine months and twenty days, fifty-five persons died there, of whom ten were males, from thirteen to seventy-three years of age, and eight females, from thirteen to forty-seven, in the year 1797. This year, 1798, I believe it has been healthy there as well as at Providence. [*Further extracts from Mr. Brown's account of the Yellow Fever will appear in some of our future numbers.*]

REVIEW.

ART. I. *A New Nomenclature of Chemiſtry, propoſed by Meſſrs.* De Morveaux, Lavoiſier, Berthollet *and* Fourcroy. *with Additions and Improvements. By* Lyman Spalding, *M. B. Lecturer in Chemiſtry in Dartmouth Univerſity. Hanover (N. H.)* Davis. 1799. 4to. *In a Series of Tables.*

FEW publications give us more pleaſure than thoſe which indicate the ſpread of ſcience among the American people. We find, by the piece before us, that a taſte for chemical inquiry has manifeſted itſelf in Dartmouth College, and that the enterprizing Lecturer, whoſe appointment we announced in our vol. ii. p. 337, has undertaken to facilitate the acquirement of that kind of knowledge, by editing a Nomenclature for the uſe of the ſtudents.

Dr. Spalding modeſtly ſtates his motive for venturing upon this publication; that, being impreſſed with a ſenſe of the importance of chemical ſcience, as well as of the difficulty in learning it, ariſing from the introduction of a new language, and from a multiplicity of ſynonymous terms, he had been prevailed upon ſo far to amend the Nomenclature propoſed by the French philoſophers in 1787, as to adapt it to the *preſent* ſtate of things.

On inſpecting the liſt of ſimple or elementary ſubſtances, we find the number conſiderably reduced. This reduction chiefly ariſes from the perſuaſion the author felt, that many of the *vegetable*, and ſome of the *animal* acids, poſſeſſed not *ſimple* but *compound* radicals of carbon and hydrogen; and that ſome others, particularly thoſe of animal derivation, as the pruſſic, bombic, formic, ſebacic, and lithic, contained ſepton or phoſphorus, or both, in addition to the carbonic and hydrogenous matter of their baſes. He has, accordingly, removed theſe unknown and ſuppoſed ſimple radicals, to thoſe parts of the nomenclatural arrangement in which, as far as in the preſent ſtate of knowledge and probability can be eſtimated, they ought to be placed. And, in the execution of this, we generally agree with him.

In other reſpects the diſpoſition of the articles is very much as in the original plan; even to the retention of ammoniac in the catalogue of elements, notwithſtanding its having been ſince ſhewn to be a compound of ſeveral. It ſtrikes us, however, there are ſome elementary bodies omitted which it had been better to have retained. Why, for inſtance, if Dr. S. did not think it worth the while to inſert *auſtrala* and *adamantine* as primitive earths, did he neglect to inſert ſo incontrovertibly a diſtinct ſpecies as *alumine* or clay? Though he might have thought the metal *titanium* worthy a place with the fancied appellations of *ſiderite*, *ſaturnite*, and *menackanite*, which have been impoſed on the public, yet wherefore has he omitted *chrome* among the real metals?

Among the amendments, we obſerve, that, purſuant to Profeſſor Mitchill's propoſal, ſepton and its derivatives are ſubſtituted throughout for azote, azotic, nitrous and nitric. It gives us pleaſure to find that ſo material an improvement in the Nomenclature is ſo cordially adopted, and ſo generally coming into uſe. It is excellently calculated to introduce truth to the mind.

It is a pity that the fallacious term *hydrogen* had not been expunged, and the well known word *phlogiſton* received in its place. Hydrogen is interpreted to be the baſis of water. True; but is it not alſo the baſis of every thing which burns with *blaze*, or exhibits *flame?* Oil, alkohol, ether, reſin, wax, tar, coal, wood, and many other ſubſtances, when they undergo combuſtion in the open air, are *blazing* or *flaming* bodies. Water may be made to undergo combuſtion, or to burn with flame alſo. In framing a philoſophical language, it is neceſſary to give to each thing a name which ſhall be at once *comprehenſive* and *preciſe*. Phlogiſton happily expreſſes, at once, the character in which water and inflammable bodies generally agree, and the particular phenomenon of *flame* or *blaze*, whereby they differ from all others. *Phlogiſton*, thus, will mean that claſs of the particles of matter which *blaze* or *inflame*; *phlogiſtous air*, or the air which burns with blaze, will be the new name of hydrogenous gas; and oxyd of phlogiſton the term for water. For more particulars of this, ſee our Repoſitory, vol. i. p. 515. vol. ii. p. 53. and Nicholſon's Journal of Natural Philoſophy, &c. for February, 1798.—We are firmly perſuaded this amendment would have a very conciliatory and pacific effect in the chemical world.

In all the Nomenclatures we have peruſed, the article of

light appears to have been very imperfectly ſtated. It appears to us that light reſembles oxygen, phlogiſton and ſepton, in one reſpect; that is, it is never capable of being obtained in a diſtinct form. It is proper, however, to give a name to the ſubſtance in the abſtract. In the common form that light is preſented to us, it is a gas, or a ſolid diſſolved in caloric. On the decompoſition of this *luminous gas*, its *latent* caloric is let looſe in a *ſenſible* form. A multitude of phenomena depend upon this conſtitution of fluid or ordinary light, from its ſolution in caloric, which are well worthy of Count Rumford's attention. It will be found that the laws governing the compoſition and decompoſition of that wonderful fluid the ſun-beam, muſt be inveſtigated, in order to unfold to us the true doctrine of light and heat in this planet and in the univerſe.

This fluid light has an attraction for oxygen, and diſſolves a portion of it with extreme readineſs. This compound is the *gaſeous oxyd of light*, or common dephlogiſticated or oxygenous air. It is utterly a miſtake of the framers of the Nomenclature, and all their followers, to aſſure their readers that vital air conſiſts merely of caloric and oxygen. If this was the caſe, oxygenous gas ought itſelf to be an acid, and ſhould be incapable of exhibiting light on its decompoſition. But oxygenous air is ſo far neutralized by light *as not to be four*, and thereby is enabled, on its decompoſition, to give out *the luminous fluid by itſelf.*

We believe it is highly probable that ſome modification of *oxydated light*, when fixed in certain fæculæ or grounds, is the baſis of *permanent colours*, as Dr. Bancroft ſeems firſt to have ſuggeſted. We know of no inſtance of oxygen being diſſolved in luminous gas beyond the degree of oxyd. At this point their union ceaſes, by which wonderful proviſion fluid light is prevented from turning, in all caſes, to an acid, and the ſuperfluous oxygen is diſcharged to form new aſſociations. We may, therefore, be conſidered as being acquainted with light in the four following forms: 1. Pure or elementary. 2. Fluid, by ſolution in caloric. 3. Gaſeous oxyd of light, or oxygenous air: and, 4. Fixed oxyd of light, or baſis of permanent colours. We hope this excellent example of Dr. S. will be followed in all the colleges of the United States.

ART. II. *Notes on Huſbandry and Rural Affairs. By* J. B. Bordley. *Philadelphia.* Dobſon. 1799. 8vo. pp. 591.

WORKS on agriculture claim, from their very title, a conſiderable ſhare of reſpect; ſince there is nothing more deſerving of inveſtigation, or, indeed, ſcarcely any thing which needs it more, than the cultivation of the earth. That farmer who improves the methods of tilling the ground, increaſes its produce, and abridges the labour and augments the comforts both of man and beaſt, is certainly entitled to high commendation. And when, in addition to this beneficial employment of his talents, he endeavours to make known his experience to others, and to diffuſe and multiply knowledge, by publiſhing the reſults of his inquiries, he really ſeems to poſſeſs a ſtill higher degree of merit. Facts relative to rural economy in America deſerve eminently to be collected. Comparative experiments on the ſoil and productions of the different parts of the weſtern continent are exceedingly wanted. So little has hitherto been publiſhed on American huſbandry, and ſo imperfectly do we know what is moſt ſyſtematic and beſt to be done, that it has been a cuſtom with thoſe who ſought information from books, to read the Britiſh publications, and to adapt the principles and practice of agriculturaliſts in that iſland to the various ſoils and climates of America. The inconvenience and injury which have ariſen from an adoption, in this land, of modes recommended as ſucceſsful in a region ſo widely different as Great-Britain, have led not a few of our farmers to a contempt of all "knowledge derived from books." This is a misfortune: and when it is conſidered that many of theſe farmers are choſen to repreſent the counties and towns in which they live, in the Legiſlature, it often becomes a ſubject of lamentation, with what inflexible zeal they oppoſe almoſt all attempts to improve the condition of agriculture, by incorporating ſocieties, granting premiums, eſtabliſhing agricultural and botanical gardens, and every thing of the kind. This ſpirit is to be corrected by availing ourſelves of the modes of practice in agriculture which are found to be good in each particular ſituation, ſoil and climate, and thereby convincing thoſe ſturdy "*terræ filios*," that farming is ſomething more than a mere empirical art, and that it is ſuſceptible of great and various improvement.

But, though facts ſhould be collected with care and arranged with judgment, there is ſomething worthy the attention of every author as to the manner of preſenting his ſentiments to the public. We fear that ſome perſons have felt diſcouragement at the ſize of a ſolid octavo of ſix hundred pages, and that others, who were not intimidated by its bulk, may have forborne to peruſe it on account of the price. Books intended for general inſtruction ought to be as conciſe as a regard to perſpicuity will permit, and no dearer than the materials and labour employed in the manufacture require. Through inattention to theſe particulars, the extent of the good which many publications were calculated to produce, has often been very much circumſcribed.

As to the matter of Mr. Bordley's book, it is proper to apprize our readers that it is not a philoſophical inquiry into the conſtituent parts of ſoils, nor of the number and qualities of elementary earths, nor of the compoſition or decompoſition of manures, nor of the noxious mineral ingredients with which land is ſometimes impregnated. Exceedingly different is it from that elegant and compendious tract on natural and chemical principles by GYLLENBORG, for a verſion of which the Engliſh reader is indebted to Mr. MILLS; and it poſſeſſes very little reſemblance to the chemical and ſcientific reſearches of RUCKERT, DUNDONALD and KIRWAN.

Mr. B. who was an American farmer, has, on the other hand, offered to his fellow-citizens a *practical* performance, comprehended in thirty-two chapters, which may be conſidered as ſo many diſtinct eſſays on various branches of huſbandry. The principal of theſe are on rotations of graſs and grain, clover, beans, wheat, maize, hemp, potatoes, and rice, and on farm yards, barns, fences, cattle-ſtalls, country habitations, ice-houſes, diet in rural economy, and on yard-manure and gypſum. He treats alſo of the paſturing, ſoiling, keeping and fatting of cattle, and of the breeds of neat-kine, ſheep and hogs; as well as on the treading out of wheat as preferable to threſhing, on the purification of ſea-ſalt for family uſe, and ſeveral other ſubjects.

Among theſe eſſays, we obſerve the one *on gypſum* to be but an abſtract of the valuable publication of which we gave an account in our vol. i. p. 351 & ſeq. The *propoſal for a State Society of Agriculture* is a republication of what we remember to have ſeen, ſeveral years ago, in the form of a pamphlet. It was an application to the Legiſlature of Penn-

fylvania, in 1794, to incorporate a ſociety for the promotion of agriculture; which, Mr. B. informs us, was rejected, and by "*huſbandmen* who were principally to be benefitted," (p. 450). The long chapter, entitled "Notes and Intimations," at the end of the book, and which amounts to conſiderably more than a fifth part of the whole, is made up of quotations and extracts from YOUNG, DOSSIE, TOOSEY, AMOS, MARSHALL, KIRBY, TWAMLEY, and others, interſperſed with obſervations by Mr. B. and facts collected by himſelf. He borrows alſo from the New-York Tranſactions, the Bath papers, and ſome other periodical publications.

Of that part of this volume which is more particularly the reſult of Mr. B.'s perſonal obſervation and experience, we think it juſt to remark, in general, that it appears to be the collected knowledge of a careful, candid, judicious and economical farmer, who, beſides the inſtruction derived from his own practical trials, had availed himſelf, by reading, of whatever was to be gained from the labours, ſucceſsful or otherwiſe, of others. We apprehend, however, the largeneſs of the capital neceſſary to purchaſe and conduct a farm according to Mr. B.'s directions, will be an inſuperable obſtacle to its adoption by both the poor and middling claſs of cultivators. The more wealthy alone can carry into effect his *deſign* for rotations of crops, and his *plan* for a farm-houſe and yard.

The twenty-firſt chapter, "on the Principles of Vegetation," is, we are inclined to think, the leaſt valuable in the volume; as the one which immediately follows it, "on Neceſſaries of Life as the beſt Products of Land and beſt Staple of Commerce," is, in our opinion, the moſt ſo to a political economiſt. The preferableneſs of cultivating *bread-corn* inſtead of *wine* and *ſilk*, is ſtrikingly pointed out, in relation to the happineſs of the cultivators, and to the public weal. The eſſay (p. 318) on "purifying Salt" for domeſtic uſe, is an excellent piece of advice to heads of families. It is well known that different kinds of ſalt poſſeſs very different qualities, ſome being far better to preſerve meat and butter from putrefaction than others. This inferiority of antiſeptic power muſt be owing to the admixture of foreign ſubſtances with the genuine muriate of ſoda. And the method of waſhing away the noxious *bittern* and *ſlack*, with which many ſorts of it are commonly adulterated, is eaſy, well-deviſed, and likely to do good. The obſervations "on Fences," tending to enforce the neceſſity of planting hedges, as timber for poſts

and rails grows ſcarce, are very proper and ſeaſonable; though Mr. B. does not appear to know that the hawthorn is one of thoſe plants whoſe ſeeds do not ſprout before the ſecond year after they are planted, (p. 239). We recommend to him Mr. HAVENS's experiments, publiſhed in part iii. of the Tranſactions of the Agricultural Society of New-York, and mentioned in our Review, vol. ii. p. 316.

The receipts for a number of wholeſome, palatable and cheap diſhes in rural economy are very important; and to thoſe who cannot have acceſs to the original publications whence they are taken, they muſt be deemed a uſeful collection. For the principles of cookery, as applied to cheapen living and improve diet, we refer the reader to RUMFORD's Eſſays. It is comfortable intelligence that ſeven hungry men can be furniſhed with a good dinner for four cents a-piece! (p. 413). In the State-Priſon of New-York, the daily diet for the convicts, including a dinner made of beeves' heads, with potatoes and cabbage in ſoup, and an allowance of brown bread, does not exceed ſix cents for a man. The bad and waſteful cookery throughout the land is a doleful drawback upon agricultural profit, and loudly calls for a reform; and the more ſo, as, we believe, in the preſent ſtate of ſociety, none are more ſqueamiſh with regard to their food than the poorer order of houſe-keepers, and hired labouring people in the country.

Mr. B.'s remarks on timothy, clover and wheat, on cattle, ſheep, hemp and maize, are, generally, ſo ſenſible and proper, that we prefer a reference to the chapters on thoſe articles ſeverally, rather than an abridgement of them here. After this copious diſplay, our readers will, we hope, excuſe us from enlarging any further on a work, concerning which we have ſaid enough for the information of thoſe who are deſirous of general knowledge only, and for ſtimulating the curioſity of ſuch as may be deſirous of a more minute acquaintance with the book itſelf.

ART. III. *A Brief Hiſtory of Epidemic and Peſtilential Diſeaſes; with the principal Phenomena of the Phyſical World, which precede and accompany them, and Obſervations deduced from the Facts ſtated. In two Volumes. By* Noah Webſter. *Hartford.* Hudſon *and* Goodwin. 1799. 8vo. pp. 700.

THIS work, whoſe commencement and progreſs we have repeatedly announced, has been an object of great expectation. The publication of a number of letters, by the ſame author, towards the end of the year 1797, through the medium of the newſpapers, which contained ſome of the facts and principles more amply diſcuſſed in theſe volumes, and which were eſpecially occaſioned by the controverſy concerning the importation or domeſtic origin of the yellow fever, excited much attention wherever they were read. Soon after the date of thoſe letters the plan of this work was formed, and, ever ſince, the publication of it has been waited for with impatience. But, however high the expectations of thoſe who know the induſtry and zeal of the learned author, as well as the fertility of the ſubject, we ſhall venture to engage that they will be far exceeded by the peruſal of his performance. No labour has been ſpared to render it as worthy of the public patronage, and as uſeful as poſſible. The collection of facts, as well as the conſultation of authorities, is eminently great; and although a multitude of difficulties muſt have ariſen, in conducting the reſearch, from a deficiency of records and ſcantineſs of libraries, we are happy to find ſuch difficulties ſo ſucceſsfully overcome.

In our judgment Mr. Webſter has performed a great work. Whether we conſider the extent and novelty of the deſign, the diligence, acuteneſs, and erudition diſplayed in the inveſtigations, the ingenioufneſs and ſagacity of the combinations, or the importance of the reſults; whether we conſider the revolution of opinions which it tends to effect, or the range of inquiries which it is adapted to awaken, we muſt pronounce him entitled to the praiſe of an inſtructive and original writer.

The comparative mildneſs and infrequency of peſtilential epidemics, in the more civilized parts of the world, in modern times, and the prevalence of the doctrine of the importation of contagion, had produced a degree of inattention amounting almoſt to forgetfulneſs of the principles which

uſually govern the courſe of ſuch diſeaſes. The recent experience of many parts of the United States, as well as that of more diſtant places, has ſerved to recall our attention to this momentous inquiry. And, after a re-conſideration of the whole ſubject, aided by all the light which the wiſdom and obſervation of a ſeries of ages could offer, our author, in the work before us, preſents the fruits of his laborious and perſevering reſearches.

To contemplate peſtilential diſeaſes with more advantage, and to compare and digeſt their phenomena, as they occur in diſtant countries and remote ages, Mr. W. aſſumes the ſtation of an hiſtorian, and cauſes to paſs before him, in review, a long ſeries of thoſe diſeaſes, with a train of occurrences in the phyſical world accompanying or preceding them, in order that they may mutually lend their aid in explaining and illuſtrating each other. It is aſtoniſhing to reflect that this is the firſt attempt to write a hiſtory of epidemic and peſtilential diſtempers. To compoſe ſuch a work in the beſt manner, it is neceſſary to collect, and to bring under proper points of view, the facts which lie diſperſed through innumerable volumes; to read the writers of each age and nation in the original; to enter into the ſpirit and circumſtances of the times when they wrote; to examine the ſtate of ſociety, the diet, clothing, habitations, cuſtoms, manners, &c. of the people, as well as to aſcertain the nature of the ſoil, the face of the country and the climate wherein they occur. A great deal of this has been accompliſhed by our author; but much of it can never be attempted from the want of materials, owing to the defects of hiſtorical records, to the ravages of time, or to the devaſtation of barbarians.

The leading object of this work is to prove that epidemic and peſtilential diſtempers originate from a deleterious agent or agents, operating through the medium of the atmoſphere, ſometimes locally, and ſometimes over the whole globe, diſappearing and returning at unequal periods. This is preciſely the *epidemic conſtitution* of Sydenham, of which the facts collected by Mr. W. exhibit a luminous and incontrovertible proof.

One of the moſt intereſting features of this hiſtory is the relation ſuppoſed to ſubſiſt between peſtilential epidemics and ſundry other phenomena of the phyſical world; ſuch as comets, volcanic eruptions, earthquakes, meteors, the extremes of heat and cold, exceſſive rains and drought, tempeſts, high

tides, inundations, unuſual numbers of inſects, failure of crops, famine, &c.

In the firſt ſection of theſe volumes Mr. W. treats of the diverſity of opinions reſpecting the cauſe and origin of peſtilence. He contraſts the opinions of the ancients, formed from perſonal and unbiaſſed obſervations, with thoſe of ſome modern writers, particularly Dr. Mead, who finds, in ſpecific contagion, imported from Egypt or Ethiopia, a cauſe powerful enough to kindle the plague, and to ravage whole continents.

In examining the opinions of the ancients, Mr. W. agrees with many reſpectable phyſicians, who aſcribe to Hippocrates a knowledge of thoſe epidemic conſtitutions of the air which engender peſtilence, and which they imagine his expreſſion τὸ Θεῖον to ſignify. We doubt whether this concluſion reſts upon a ſolid foundation. Hippocrates, indeed, examines the effects of the air, whether cold, hot, dry, or moiſt—of the winds as blowing from different quarters—and of reſidence in different countries, and in different kinds of habitations. He treats alſo of the different ſeaſons of the year, of the ſolſtices, equinoxes, the riſing and ſetting of ſtars, and their reſpective influences upon the human body. He compares the ſeaſons with reſpect to health, and obſerves what diſeaſes are moſt incidental to each ſeaſon. But all this goes little beyond the obſervation of the ſenſible qualities of the air—whereas, to reach the point in queſtion, it is neceſſary to admit the operation of qualities of that fluid altogether inſenſible and occult. By τὸ Θεῖον Hippocrates ſeems to have intended to expreſs various things. On ſome occaſions he employs it to ſignify Deity, or the Supreme Firſt Cauſe; and on others, probably under the influence of ſuperſtitious or aſtrological impreſſions, he uſes it to denote ſomething myſterious, incomprehenſible or ſupernatural.* If this be applied to any agency

* Θεῖον Numen, Divina Natura dicitur, rerum humanarum præcipua cauſa et in rebus humanis principatum obtinens, apud Hipp. lib. Περὶ Γυναικ. φυσ. (pag. 563. 26.) μάλιϛα μεν το θεῖον εν τοῖσιν ανθρωποισιν αιτιον ειναι—maximé quidem divinam naturam in rebus humanis cauſam obtinere. Rurſus ibidem τὰ θεια (v. 33.) δει δὲ τὸν ορθῶς ταυτα χειριζοντα, πρωτον μεν εκ τῶν θείων αρχεσθαι—eum autem qui hæc recte tractare velit, primum quidem a Divina Natura initium ducere convenit. Τὸ θεῖον etiam quod eſt divinum ſignificat, quod a Deo eſt, aut quod eſt incomprehenſibile, ut Deus, et cujus cauſam ne ue ſenſu neque cogitatione aſſequi poſſis, quo modo accipitur initio lib. Περὶ Ιερῆς Νοτσιν (pag. 301. 15. 40. 302. 14. 28. &c.) atque

in effecting morbid changes in the atmoſphere, whither does it lead us? Not, ſurely, to that preciſe, diſtinct and luminous fact of epidemic conſtitutions of air, unfolded by Sydenham, which our beſt hiſtories of diſeaſes, in all ages and countries, combine to verify. We are the more particular on this point, becauſe we think the praiſe of firſt clearly developing this proceſs of nature, in the production of epidemic diſeaſes, belongs, of right, to Sydenham. And though we meet with obſcure notices of it in many writers, from Hippocrates downwards to modern times, we are perſuaded it made little impreſſion on the minds of phyſicians, and effected few practical advantages, before the time of Sydenham.

In the ſubſequent ſections of the firſt volume, the author delivers an hiſtorical view of peſtilential epidemics, and the phenomena in the phyſical world, which accompany, precede, or follow them, from the earlieſt records to the Chriſtian era —from the Chriſtian era to the year 1347—from the year 1347 to 1500—from 1500 to 1600—from 1600 to the cloſe

alias ſæpe. Quo etiam ſenſu ει τι θειον ενεστι εν τησι νουσοισι ſumitur in quibuſdam in Progn. (pag. 118. 32. H. 36. 20.) Galenus verò poſt varias interpretum opiniones, illic τὸ θειον, την του περιεχοντος ἡμας ἀερος καταστασιν, exponit morborum populariter graſſantium generationem, quæ ex aëris conditione petitur intelligens, aut ſyderum cognitionem, quæ multum facit ad morborum prædictionem et totius anni conſtitutionem prænoſcendam. Cujus peritum eſſe medicum vult Hipp. libris Epid. et lib. Περι ἀερος, &c. Gorrh. cum Fernel. τὸ θειον intelligit aëris conſtitutionem, quæ magis proprietate totius ſubſtantiæ quam ſuis primis qualitatibus corpora noſtra offendat, quam νοσερην αποκρισιν vocat Hipp. lib. De Nat. Hum. (pag. 20. 22. H. 229. 2.) αναθυμιασιν, exhalationem ſive expirationem exponit Galen. Cujus quidem curationem optimo jure in loci mutatione et exiguo inſpirationis uſu ponit Hipp.

See Fœſius's Œconomia Hippocratis, p. 163, *included in the 2d vol. of the works of Hippocrates—Geneva edition of* 1657.

We ſee not upon what ground Galen refers to morbid conſtitutions of the air the paſſage above quoted from Hippocrates' book of Prognoſtics ἅμα δε και ει τι θειον ενεστιν εν τῆσι νουσοισι. As no quotation more pointed than this is mentioned (and we do not ourſelves remember one more ſo), it may be affirmed that Hippocrates has no where explicitly delivered the doctrine of epidemic conſtitutions, dependent on other than the ſenſible qualities of the atmoſphere. The expreſſions themſelves are ſo vague and indeterminate, the context ſo irrelevant, and the world, at that early age, was ſo overrun with ſuperſtition, that we believe thoſe words can never be ſatisfactorily interpreted. Beſides, it does not appear that Galen himſelf had any clear apprehenſion of this ſubject; and, therefore, he was totally unfit to detect, in the writings of Hippocrates, a latent doctrine, of which himſelf had no accurate conception.

of the year 1700—from the year 1701 to the year 1788—and from the year 1788 to the year 1799, including the laſt epidemic period.

It will be readily perceived, from the nature of this narrative, comprehending a great body of facts, drawn from a variety of ſources, with occaſional remarks on the facts ſtated, that it admits neither of analyſis nor abridgement. We feel, however, the leſs regret on this account, as we are perſuaded none of our readers will fail to peruſe the work itſelf.

The ſecond volume is introduced with bills of mortality for the two laſt centuries, with an account of the principal cotemporary phenomena of the elements. Theſe bills are for London, Augſburg, Dreſden, Boſton, one religious ſociety in Philadelphia, with a few of Paris and Dublin. After theſe the author delivers ſome general remarks on the preceding hiſtory, and the bills of mortality. And, as theſe remarks exhibit an outline of the hiſtorical facts, and of the principles deduced from them, and, at the ſame time, afford a ſpecimen of the author's ſtyle and manner, we lay them before our readers. (Sect. x. p. 10.)

" Imperfect as ancient hiſtory is, in regard to the accounts of diſeaſes, and the extraordinary phenomena of nature, we find, that between the year B. C. 480 and the Chriſtian era, a number of violent plagues occurred; moſt of which coincided in time with the following phenomena: comets, eruptions of volcanoes, earthquakes, drouth, ſevere winters, diſeaſes among cattle. Of thirteen comets mentioned in the foregoing hiſtory, which are all whoſe dates I am able to aſcertain, *eight* of them coincide with volcanic eruptions of Etna, the only volcano of any note which the hiſtory of that period has recorded; and *eleven* of them coincide in time with peſtilence. If we conſider the ſcarcity of our materials for a hiſtory of theſe phenomena, at that period, and make due allowances for the uncertainty of chronology, we ſhall find reaſon to be ſurpriſed at ſuch a number of theſe coincidences. In ſeveral inſtances we find extreme drouth, and very ſevere winters, to correſpond in time with comets and eruptions of Etna, conformable to facts in modern days.

" On this ſubject hiſtory is barren alſo for many centuries after the Chriſtian era. Yet in every period, even in the dark ages, we find numerous coincidences of the great phenomena above-mentioned. All the great plagues that have af-

flicted mankind, have been accompanied with violent agitations of the elements.*

" This obſervation reſts particularly on the events that preceded and attended the peſtilences of the following periods: A. D. 80—167—252—375—400—445—542—558—590—639—679—682—745—762—802—905—994—1005—1031—1044—1069—1106—1135—1142—1162—1181—1222—1242—1300—1347—1368—1400—1477—1500—1531—1577—1602—1625—1636—1665—1699—1709—1719—1728—1743—1751—1760—1770—1783—1789—Many facts, in other periods, concur to prove the truth of the remark.

" The phenomenon moſt generally and cloſely connected with peſtilence is an earthquake. From all the facts that I can find in hiſtory, I queſtion whether an inſtance of a conſiderable plague, in any country, can be mentioned, which has not been immediately preceded or accompanied with convulſions of the earth. If any exceptions have occurred, they have eſcaped my reſearches. It does not happen that *every place* where peſtilence prevails is ſhaken; but during the progreſs of the diſeaſes which I denominate *peſtilence*, and which run, in certain periods, over large portions of the globe, ſome parts of the earth, and eſpecially thoſe which abound moſt with ſubterranean fire, are violently agitated.

" By adverting to the foregoing hiſtory, the reader will find that all thoſe years in which conſiderable earthquakes have occurred in America, have been remarkably ſickly. Theſe years are 1638, 1647, 1658, 1662-3, 1668, 1727, 1755, 1783. See the hiſtory and the bills of mortality. Even the ſlighter ſhocks have been attended with conſiderable ſickneſs, or have introduced a ſeries of epidemics, being contemporary with the meaſles, influenza or ſore throat, as in 1669, 1720, 1737, 1757, 1761, 1769, 1771, 1791, 1797.

* " Modern philoſophy objects to the popular ſenſe in which the word *elements* is uſed; ſince it appears that what has uſually been conſidered as an *element*, is found, by modern chemiſtry, to be a compound ſubſtance, reſolvable into parts, in the nature and properties, diſtinct. Notwithſtanding theſe diſcoveries, I cannot conſent to diſcard the popular uſe of the word *element*. Nature preſents to the ſenſes of man fire, earth, air and water, in a particular and predominant form. This is the form in which they appear to be moſt uſeful to man, and to be the conſtituent materials of other ſubſtances, as well as the agents in carrying on the great viſible operations of the ſyſtem. I therefore conſider the popular diſtribution as natural and convenient.

" To enumerate the inſtances in Europe and Aſia, would be a uſeleſs repetition of the events related in the preceding hiſtory, to which the reader is referred.

" Another phenomenon, which, next to earthquakes, appears to be moſt cloſely connected with epidemic diſeaſes, is the eruption of fire from volcanic mountains. In this article hiſtory is deficient, or I have not been fortunate enough to find the works neceſſary to furniſh a complete view of theſe phenomena. There are whole centuries in which the books I have conſulted mention no eruption of Etna and Veſuvius. The account of eruptions in Iceland, from the year 1000, taken from Pennant's Arctic Zoology, vol. i. p. 331, is probably complete, or nearly ſo. Of the volcanoes in the Andes we have very few accounts, as well as of thoſe in the Moluccas. Of thoſe in the arctic regions of Aſia and America we know very little.

" Notwithſtanding theſe defects, we are able, by the eruptions in Italy, Sicily, and Iceland, to arrive to ſome very important concluſions. The reader muſt have noticed, in the preceding hiſtory, the coincidences in time between volcanic diſcharges and winters of unuſual ſeverity. Theſe diſcharges either precede or follow the winter. Thus the eruptions of 1766, 1779, and 1783, were immediately followed by intenſely cold winters. The ſevere winters of 1762-3, and 1779-80, were ſpeedily followed by eruptions. Theſe inſtances will ſerve as ſamples of the ordinary courſe of theſe events. Sometimes the eruptions continue, or are repeated, for a number of years in ſucceſſion; but the eruptions, when continued, are moderate, and the ſeaſons variable. When the volcanoes have been for ſome years quiet, and that ſuſpenſion is followed by a great diſcharge, it appears to me that ſevere winters invariably follow or precede the diſcharge, within a few months. So alſo, when an eruption is continued for a number of years, if at any time the diſcharge becomes violent, a ſevere winter attends it, as in 1669. Etna was in a ſtate of eruption from 1664 to 1679; but in 1669 the diſcharge was immenſely augmented, and the winters next preceding and following were very ſevere.

" There are ſome years in which eruptions are noted, of which I find no account reſpecting the ſeaſons. Perhaps ſome of theſe will, on further inveſtigation, be found to be exceptions.

" It is to be obſerved, that, in ſome caſes, a ſevere winter

extends to both hemiſpheres, ſometimes to one only, and, in a few caſes, to a part of a hemiſphere only. Thus, in 1607-8—1683-4—1762-3—1766-7—1779-80—1783-4, the ſeverity extended to both hemiſpheres. In 1640-41—1739-40, and in other inſtances, the ſevere winter in Europe preceded, by one year, a ſimilar winter in America. In a few inſtances, ſevere froſt takes place in one hemiſphere during a ſeries of mild winters in the other; but this is leſs common. In general, the ſeverity happens in both hemiſpheres at once, or in two winters in immediate ſucceſſion; and, as far as evidence has yet appeared, this ſeverity is cloſely attendant on volcanic diſcharges, with very few exceptions.

"Another phenomenon which uſually coincides in time with ſevere winters, is the approach of comets. I have been ſtruck with ſurprize at the coincidences of this kind. There are a few inſtances on record of mild winters during the appearances of theſe bodies; but in theſe caſes the comets have appeared to be ſmall, or to paſs the ſyſtem at an immenſe diſtance from the earth. The large comets, and thoſe which approach near to the earth, *ſeem* to produce, almoſt uniformly, great heat, exceſſive drouth, followed by very cold winters, tremendous ſtorms of wind, rain, ſnow and hail, unuſual tides, or ſwell of the ocean, and, uſually, volcanic eruptions. How far theſe phenomena are connected, as cauſe and effect, future obſervations may determine. Some of them occur ſo uniformly in the ſame year, that I cannot reſiſt the evidence of their connection.

"After a volcano has been many years quiet, its diſcharges are, I believe, always preceded by extreme drouth; and this defect of water is not only obſervable in the vicinity of the volcano, but often extends over a whole continent, if not over the world. Many inſtances have been related: it is ſufficient here to mention the exceſſive drouth in 1762 and 1782, preceding eruptions of Etna and Heckla. In theſe years almoſt all ſprings were exhauſted, over a great portion of America.

"Cold winters ſometimes follow wet ſeaſons, but, more generally, a very hot ſummer or very dry autumn. Sometimes two or three ſevere winters occur in ſucceſſion, as in 1766, 1767, and 1768—and in America, from 1796 to 1799.

"The years when comets approach, or volcanoes diſcharge fire, and when the atmoſphere exhibits fiery appearances, as meteors, ſtreams of light, and mock ſuns, are, beyond com-

parifon, the moft tempeftuous. Witnefs the years 1766, 1771 and 1772, 1780, 1783, 1784 and 1785, 1788, 1797. In fuch years the rifk on veffels at fea is greatly increafed.

" As dry feafons ufually precede volcanic eruptions, fo very wet feafons often follow them. This feems not to be the invariable courfe of events; but there are remarkable inftances of deluging rains after thefe difcharges. Witnefs the feafons following the univerfal convulfions of the earth in 1692 and 1693, and 1766. Thus the electricity is re-conducted to the earth.

" In every cafe, I believe, this remark will be found true; that the approach of comets, and volcanic eruptions, difturb the regular courfe of the feafons. The heat of fummer and the cold of winter are in extremes; more fnow is generated in winter, and more hail in fummer; tempefts are more violent and frequent, meteors more numerous, and rain more unequally diftributed over the earth.

" A feries of epidemic difeafes, meafles, influenza, affections of the throat, followed by peftilential fevers, appear generally to commence and take their departure from fome of the great agitations of the elements above recited. This, at leaft, has been the cafe in America in the four laft periods, beginning with 1756 and 1757, 1769 and 1770, 1782 and 1783, 1788 and 1789. This fact will want no authority but a bare infpection of the preceding hiftory and tables.

" The continuance and the varieties of the difeafes feem to depend on fimilar difturbances in the elements; and, as the difcharges and motions of the electrical fluid depend on no certain laws that are known, they are irregular, and may contribute to vary the order and the nature of difeafes. In fome cafes there has been a continued feries of epidemics for twenty years, in which the common order is not exactly obferved; but this is not frequent. A remarkable inftance occurred between 1727 and 1744.

" Thofe periods, in general, have been moft diftinguifhed for ficknefs over the world, in which the fire of the earth has exhibited the moft numerous and violent effects. Witnefs the period from 1631 to 1637, when the three moft noted volcanoes difcharged immenfe quantities of fire and lava; and fevere peftilence extended over all Europe and America. A fimilar remark may be made concerning the period of the laft univerfal peftilence in Europe, from 1663 to 1666—alfo from 1691 to 1695—from 1727 to 1730—1759 to 1764—1769 to

1772—1774 to 1777—1783 to 1786—and concerning ſome ſhorter periods, all of which produced epidemics in both hemiſpheres.

"Slighter eruptions and earthquakes, which are almoſt annual, ſeem to have leſs effect. The fire of the globe is in perpetual motion or action, and to this great agent, philoſophers are agreed, are to be aſcribed the changes of ſeaſons, and the generation of rain, hail and ſnow. Its operations, however, are not all of them viſible, nor even perceptible, until they appear by their effects. It is probable that the *inviſible* operations of the electrical fluid produce more effects than thoſe which are ſeen. Indeed, we may queſtion whether moſt of the viſible phenomena of that principle are not mere *effects* of that action which influences the vegetable and animal world. It is probable to me that neither ſeaſons, earthquakes, nor volcanic eruptions, are the cauſes of the principal derangements we behold in animal and vegetable life, but are themſelves the *effects* of thoſe motions and inviſible operations which affect mankind. Hence catarrh, and other epidemics, often appear *before* the viſible phenomena of eruptions and earthquakes."

—

We have no heſitation to admit, that the frequent coincidence of theſe great phenomena, as ſtated by Mr. Webſter, is a moſt intereſting fact in the order of nature. Enough has been obſerved to ſtimulate inquiry to the utmoſt; and it is to be hoped, that inceſſant attention will be directed to this object, until our diſcoveries concerning it become more ſatisfactory and complete. We may, however, be permitted to remark, that it is requiſite to know much more of nature before we can hope to aſcertain the preciſe degree of connection or dependence of theſe occurrences upon one another; whether they ſtand in the relation of cauſe and effect, or whether they may all be conſidered as effects of a common cauſe. To determine this point with accuracy, not only more numerous and more minute obſervations will be neceſſary, but, as the eſtimate of the coincidences exhibits a negative as well as an affirmative reſult, it remains, as exactly as poſſible, to adjuſt this proportion before we can ſafely deduce principles, or arrive at a firm concluſion.

We cannot help repeating our hopes that this work may be generally read. A phyſician muſt bluſh at the neglect to avail himſelf of the maſs of information here offered to view.

more eſpecially in the preſent ſtate of our country, when the terrors of peſtilence annually invade every boſom. But we indulge the perſuaſion that this work will be attentively peruſed greatly beyond the limits of the medical profeſſion. No perſon ſhould be ignorant of it who ſuffers his mind ever to paſs beyond the line of his immediate vocation. It is to the honour of the preſent age that an acquaintance with the elements of medicine, and of all its auxiliary branches of knowledge, is becoming much more popular, and more widely diſſeminated than formerly. If this acquaintance ſhould be enlarged, by ſtripping that ſcience of ſtill more of its technical jargon and myſterious mummery, the advantages would be incalculable. All who prepare themſelves for the departments of civil and active life, and even ſuch as devote themſelves, in their cloſets, to mere ſpeculations on the intereſts and improvement of mankind, will here find an abundance of matter for uſe as well as for meditation. The legiſlator, the civil magiſtrate, the political economiſt, the military and naval commander, and the patriot who conſecrates his labours to the ſervice of his country, may all draw from hence information of importance to the proſecution of their reſpective objects.

In the remainder of the ſecond volume Mr. Webſter proceeds to deduce many principles and opinions from the body of facts which occupies the preceding parts of the work. In many of theſe we ſhall entirely concur with him; concerning others we entertain doubts; and, with reſpect to ſome, we ſhall be conſtrained to diſſent from this eſtimable author.

(To be continued.)

ART. IV. *Hiſtory of the Peſtilence commonly called Yellow Fever, which almoſt deſolated Philadelphia in the Months of Auguſt, September and October*, 1798. *By* Thomas Condie *and* Richard Folwell. *Philadelphia.* Folwell. 8vo. pp. about 200.

THE maſs of information contained in this piece, relative to the viſitation of Philadelphia by the plague in 1798, renders it an intereſting compilation. It is not only calculated to gratify the curioſity of the inhabitants on their return to

their homes, after ſeveral months of exile and diſperſion; but is capable of affording inſtruction to the hiſtorian, or man of reſearch, who, at a future day, may wiſh to conſult an original performance. This, and ſimilar publications, will, in ſeveral reſpects, acquire additional value by age, and the generation to come will probably reſort to them as authorities. Mr. Condie and Mr. Folwell have ſaved from oblivion a great number of facts and events, highly worthy of preſervation. Accounts of plagues, and diſaſters by ſickneſs, deſerve to be conſidered as important parts of the hiſtory of the human ſpecies. A mortality which exceeds four thouſand deaths in about three months (p. 108), well deſerves to be remembered.

The perſon who wiſhes to ſee meteorological regiſters for 1798, and ſeveral of the preceding years; to examine daily returns of the ſick, as well thoſe who recovered as thoſe who died; and to inſpect a liſt of the names of the deceaſed, may be fully gratified by conſulting this publication.

He will find alſo a ſketch of the ſituation, population, and climate of Philadelphia, with an enumeration of ſome natural phenomena, and diſeaſes of domeſtic animals, which preceded the plague, and a ſummary of opinions concerning the nature of the peſtilential matter.

He may peruſe, likewiſe, a parcel of affidavits, queries and their anſwers, and a number of other ſtatements on the ſtanding themes of altercation, whether the diſtemper is contagious or not? imported or otherwiſe? Of theſe, as being the leaſt uſeful part of the work, we ſhall not attempt an abſtract; but refer ſuch of our readers as are fond of this ſort of controverſy to the papers and vouchers themſelves.

On theſe queſtions we preſume our opinion is generally known. We think that *putrid* matter may be converted into *peſtilential* matter, by certain chemical changes in the *fluids perſpired* from the ſkin of human beings, and remaining too long in their garments; and in their *alvine* and *urinary diſcharges*, whether kept in chambers or thrown into holes in the earth; and, in many inſtances, even *in the ſtomach and inteſtines themſelves*, whence poiſon may be ejected by *vomiting* and in *ſtools*. Under equal circumſtances, this appears to have been the caſe at all times and places; and it prevails now, in America, as it does, and ever uſed to do, in Europe, Africa and Aſia. Human excretions are prone to turn to peſtilence every where; and, in the order of Providence, this is wiſely ordained, leſt mankind, if not thus in-

commoded by them, ſhould wallow in their own naſtineſs. In all thoſe caſes, however, the venom derived from human bodies, or their excrements, is not of a ſpecific kind, prepared by vaſcular action, but of that common quality which putrefaction engenders occaſionally in all that claſs of inanimate natural bodies which contains its conſtituent ingredients. A yellow fever or a dyſentery may, therefore, be as readily derived from the ſeptic fumes of a barrel of corrupting beef or fiſh, as from a jorden filled with ſimilar animal ſubſtances, in as advanced a ſtate of corruption, diſcharged from the ſtomach and inteſtines of a perſon who has fed freely on thoſe articles of food.

Of peſtilential fluids ſo produced, ſhips are well known to be both the manufactories and vehicles. When ſhips arrive at the ports of their deſtination, the poiſon they contain is, of courſe, carried along within them, and miſchievous effects frequently enſue. Peſtilence, then, is ſaid *to be imported.* If by the word "import" is meant the "mere bringing in," there can be no doubt of its being a frequent occurrence. But it by no means follows, from this conceſſion, that peſtilence is imported, in *the common and commercial acceptation of the term, like merchandize*, FROM A FOREIGN HARBOUR OR CITY. A plain and frequent occurrence on board of veſſels will illuſtrate the difference of the caſes. Suppoſe a Chineſe ſow, or other female animal, on a long voyage, ſhould bring forth a litter of young in the part of a ſhip allotted to her, and that the young ones ſo produced at ſea ſhould arrive at Philadelphia, it would be literally true that the brood of pigs were imported into that city, but it would be utterly falſe to affirm they were imported from Canton. What is true of this race of young animals is true of peſtilential fluids: "THEY WERE NOT BROUGHT FROM FOREIGN PORTS, BUT ENGENDERED AND BRED ON BOARD."

ART. V. *An Account of the Malignant Fever lately prevalent in the City of New-York (in 1798).* *By* James Hardie, *A. M. New-York.* Hurtin *and* M'Farlane. 8vo. pp. 140. 1799.

THIS is a valuable local pamphlet, and well calculated to exhibit and preſerve many remarkable tranſactions during the plague of New-York in 1798. We conſider records of this kind, made while materials are eaſily to be procured, and while the recency of events enables the compiler to be correct in relating them, as choice portions of hiſtory. And we have to regret, that ſo few of the ſurvivors of great and volent diſtempers have thought it worth the while to commit to writing what they witneſſed during their prevalence. Publications like the preſent contain ſtrong delineations of human character, in times of ſuch public calamity, as almoſt diſſolve the ties of ſociety. It is to be hoped that regiſters of the principal events during ſuch ſeaſons of diſtreſs will always be kept. The want of ſuch monuments leaves us in the dark with reſpect to ſome ſevere epidemics with which the earlier ſettlements of Europeans and their deſcendants, in America, were, in former days, afflicted.

The author of the compilation now before us was in the city during the peſtilence; and, during much of the time, engaged in attending the ſick, and diſpoſing of the dead. We have reaſon to believe the account given by Mr. Hardie, of the manner in which the poor were provided for and relieved, is authentic. There is equal reaſon to conclude the liſt of donations from benevolent and generous citizens, in the ſurrounding towns and counties, for the uſe of the indigent, is correct. And we have no cauſe to queſtion the pains he took to make a full catalogue of the names of the deceaſed, which he has given alphabetically.

Mr. H. computes the deaths of the inhabitants of New-York, by the yellow fever, in the ſummer and autumn of 1798, to be two thouſand and eighty-ſix.—The medical reader is informed, that in the firſt part of the work is a number of medical facts and opinions, well worthy of being conſulted and remembered.

ART. VI. *A ſhort Account of the Yellow Fever, as it appeared in New-London, in Auguſt, September and October*, 1798, *with an accurate Liſt of thoſe who died of the Diſeaſe, the Donations, &c. &c.* *By* Charles Holt. *New-London.* Holt. 1798. 8vo. pp. 24.

FROM this pamphlet we learn, that between the 25th of Auguſt and the 28th of October, there died, in New-London, eighty-one perſons, of the diſeaſe called *yellow fever.*

Mr. Holt informs his readers that the exciting cauſe of the peſtilence was not ſuſpected to be imported, but believed generally to have originated in New-London; that the diſtemper was not contagious; that the infection was limited to a part of the city where the local cauſes exiſted; that when perſons, ſickening in that portion of the atmoſphere, were carried away into the pure air, and died there, the diſtemper did not ſpread from them to their attendants; and that, in ſome caſes, the ſick were afflicted with *glandular ſwellings*, or *buboes.*

For further particulars concerning the affliction of the citizens of New-London in 1798, our readers will recollect the inſtructive communications of the Rev. Dr. Channing, and the excellent phyſician Dr. Coit, publiſhed in our vol. ii. p. 402—408; to which we refer them.

ART. VII. *Report of the Committee appointed by the Medical Society of the State of New-York, to inquire into the Symptoms, Origin, Cauſe and Prevention of the Peſtilential Diſeaſe that prevailed in New-York during the Summer and Autumn of the Year* 1798. *New-York.* 8vo. pp. 47. 1799.

THIS is the report of the Committee of whoſe appointment we made mention in our vol. ii. p. 219. It was accepted by the Medical Society, and, as we learn, printed at their expenſe. There is much good advice in the pamphlet to the citizens of New-York, concerning the removal of filth and nuiſances, as local ſources of diſtempers, and many of the worſt and moſt dangerous ſources of peſtilential exhala-

tions are pointed out. The public ſewers, the new-made grounds, the docks and ſlips, ſinks and privies, beef, pork, fiſh and hides, burying-grounds and foul cellars, kitchens and yards, are ſeverally the ſubjects of animadverſion, on account of the ſeptic vapours which they afford.

The Committee are oppoſed to the opinion of importing the exciting cauſe of the peſtilence of the American cities from foreign places. On the queſtion of its origin, they expreſs their belief,

"That yellow fever may be produced in any country by peſtilential effluvia, without receiving an atom from a perſon ſick of a ſimilar diſeaſe; and that, from the moſt accurate reſearches they have been able to make, they think themſelves warranted in ſaying it may ariſe *on ſhore, and in this city, as readily as in the Weſt-Indies or on ſhip-board*; and this deſtroying, though ſecret agent, is none other than peſtilential vapours. They think, moreover, as the reſult of their experience, that the yellow fever is not a contagious or *catching diſeaſe*, in the popular and common acceptation of the phraſe; that it is not communicable from perſon to perſon in a pure atmoſphere, but ſpreads only in an air loaded and contaminated by putrid exhalations.

"If this be the fact, the advocates for *importation* will agree with the favourers of *local origin* in the adoption of adequate regulations on ſhore, let them differ ever ſo widely upon the ſpeculative queſtion.

"In all events, it happily turns out that the means neceſſary, in the opinion of one party, to hinder the ſpread *of the fever imported*, exactly coincide with thoſe recommended by their opponents, for the prevention *of its domeſtic manufacture*."

The diſeaſe which they inveſtigated is deſcribed as often attacking, under the mild and unalarming guiſe of ſlight catarrh or common cold; and, in its progreſs, exhibiting, along with the ordinary ſymptoms of increaſed or irregular action, bleedings from various parts of the body, abſceſſes, buboes or glandular ſwellings, black-vomitings, convulſions, and mortifications.

Subjoined to the report is an inſtructive affidavit of the maſter, and another of the mate of the ſloop Iris, of New-Haven, in which the pretended importation of yellow fever into that city, in 1794, is fully explained away.

ART. VIII. *Observations upon the Origin of the Malignant Bilious, or Yellow Fever, in Philadelphia, and upon the Means of preventing it: addreſſed to the Citizens of Philadelphia. By* Benjamin Ruſh. *Philadelphia.* Dobſon. 8vo. pp. 28. 1799.

IN free governments, where the will of the people forms the ſupreme law, it is eſpecially neceſſary that they be well informed of their intereſts and their duties. The viſitation of moſt of the large cities of the United States by a malignant and mortal ſickneſs, within a few years paſt, has rendered it neceſſary to enact laws, and to undertake various improvements, with a view to the prevention of that calamity. In order to take theſe meaſures with advantage, it becomes neceſſary for the governing powers, and, conſequently, for the people, to decide on the origin of that ſickneſs in the beſt poſſible manner.

To aſſiſt the judgment of the community on this point, and to guard againſt the fallacy which beſets ſome parts of ſuch an intricate diſcuſſion, is the object of the pamphlet now before us. And, to the end that theſe obſervations may be more univerſally underſtood, the author adopts a popular mode of treating his ſubject, ſuited, at once, to every capacity.

In conſidering the remote cauſes of the yellow fever, the author aſſerts that it is the offspring of putrid vegetable and animal exhalations in all countries; and in Philadelphia he aſſigns the following ſources: the docks—the foul air of ſhips—the common ſewers—the gutters—dirty cellars and yards—privies—putrefying maſſes of matter lying in the neighbourhood of the city—and impure pump-water.

To account for the yellow fever not occurring in Philadelphia more frequently before the year 1793, and eſpecially on occaſions of the city being remarkably overſpread with filthy and putrid ſubſtances, the author maintains that three cauſes muſt co-operate to render peſtilential diſeaſes epidemic, viz. putrid exhalations—an inflammatory conſtitution of the atmoſphere—and ſome exciting cauſe, ſuch as great heat, cold, fatigue, intemperance in eating and drinking, &c. In proof of the exiſtence of a peculiar conſtitution of the air, for ſome years paſt, in this country, and of the doctrine of epidemic conſtitutions generally, the author adduces many facts, examples and authorities; among others, ſome remarkable pheno-

mena of animal and vegetable life, the multiplication of infects, the rapid maturity and decay of fruits, the diſeaſes of cattle and other animals, &c. It is aſtoniſhing to find phyſicians, at the preſent day, aſking for proof of the fact of peculiar morbid conſtitutions of the atmoſphere, of various extent and duration, when the hiſtory of diſeaſes, in all ages and regions of the globe, leaves not a doubt on the ſubject. Can any perſon, accuſtomed to obſerve diſeaſes for half a ſcore of years, have failed to remark the impoſſibility of accounting for epidemic influences by any operation of the ſenſible qualities of the atmoſphere? Among intelligent and candid men, it ſeems to us, there can be but one opinion on this queſtion. And in further anſwer to the inquiry above ſtated, our author aſks, Why was not the yellow fever imported oftener from the Weſt-Indies, ſeeing it is ſeldom abſent from thoſe iſlands?

It has been demanded, ſays our author, why the yellow fever does not prevail every year, in cities where the filth is always the ſame in quantity and quality? For theſe differences, in the event, he accounts, by aſcribing them to the various degrees of dryneſs or liquidity produced by heavy rains or drought, ſo as to prevent the eſcape of noxious exhalations from ſuch maſſes of filth. However this may be explained, it is an undeniable fact, that in low and marſhy countries, commonly emitting great quantities of miaſmata in the ſummer and autumn, the epidemic fevers of thoſe ſeaſons ſometimes rage in one diſtrict and ſometimes in another, often leaving large portions of the country nearly exempted, or affected in a much lighter manner. Is not this a fact exactly analogous to that of the yellow fever ravaging one city, while a neighbouring one, apparently in the ſame circumſtances, is nearly or altogether exempt?

On the queſtion of the contagiouſneſs of the yellow fever, our author remarks, that contagion is of two kinds, viz. *ſecreted*, as in ſmall-pox and meazles, and generally called ſpecific—or formed out of the body by the ſtagnation and confinement of the vapours emitted from animal excretions, owing to a defect of cleanlineſs and ventilation. The former he rejects entirely; the latter, he acknowledges, may ſometimes act like the noxious exhalations from other putrid bodies. This diſtinction, he thinks, is clearly proved by the effects of heavy rains and froſt in extinguiſhing the diſeaſe; for theſe could not be ſuppoſed to act upon matters diſcharged from the bodies of the ſick.

Dr. R. denies, therefore, that the yellow fever can be imported, so as to become epidemic, in any city or country. And so far is the opinion of domestic origin from tending to ruin the credit and commerce of a trading place, that the reverse is true. By admitting that it is generated at home, we shall soon be impelled to remove its causes; whereas, by supposing that it may be imported, and acting accordingly, we shall be led to neglect the removal of the noxious sources.

The address is concluded by offering a number of directions for the removal of putrid substances from the docks, wharves, gutters, privies, cellars, yards, and other places calculated to collect and retain them—for securing the cleanliness and ventilation of ships—and also for the management of diet, the preservation of bodily cleanliness, &c.

ART. IX. *A second Address to the Citizens of Philadelphia, containing additional Proofs of the Domestic Origin of the Malignant Bilious or Yellow Fever: to which are added, Observations intended to shew that a Belief in that Opinion is calculated to lessen the Mortality of the Disease, and to prevent its Recurrence. By* Benjamin Rush. *Philadelphia.* Dobson. 8vo. pp. 40. 1799.

PURSUING the same object as in the former address, Dr. Rush proceeds to give, in this pamphlet, a popular view of many facts and opinions heretofore published in such forms as to confine their perusal chiefly to professional readers. It is to be deeply lamented that so much difference of opinion has taken place in the cities of the United States, concerning the origin and treatment of the yellow fever. But these differences will probably work many beneficial effects in the end. The community will eagerly discuss a subject in which they feel so lively an interest; and the advocates of opposite opinions will gradually familiarize to the public mind many of the leading facts and principles upon which the dispute must ultimately be settled. And much of this knowledge will be rendered indelible by association with the calamities to which it owes its existence.

The repugnance of many American physicians and people to the Sydenhamian doctrine of epidemic constitutions of the atmosphere, induces our author, in the beginning of this ad-

dreſs, to enlarge the number of facts and authorities which he had formerly exhibited in proof of that principle. Theſe are conciſe, but, at the ſame time, forcible and appropriate.

In the next place Dr. R. explains and refutes ſeveral of the more plauſible topics of reaſoning in favour of the contagiouſneſs of the diſeaſe, and not only oppoſes the opinion of its importation, but alſo exhibits a multitude of miſchiefs reſulting from the medical and popular belief of that error.

Suppoſing that the mortality of the yellow fever has been much increaſed by certain prejudices and errors, which prevail, more or leſs, among all claſſes of citizens in Philadelphia, concerning its treatment, Dr. R. adds a few general remarks on this ſubject. He accounts for much unavoidable diverſity in the modes of treatment, at different times and places, from variations of climate and ſeaſon, as well as thoſe which ariſe from age, ſex, and habit. The remedies conſidered here are the various forms of evacuants, comprizing blood-letting, purges, vomits, ſudorifics, and ſalivation. To theſe evacuating remedies are added, cold air, cold water, and ice. And, with reſpect to all of them, the principles which govern the ſelection or combination, in different circumſtances, are briefly mentioned. With an expoſition of the peculiar advantages of blood-letting, and a reply to ſome of the objections offered to it, the addreſs is concluded.

The perſpicuous and popular exhibition of the ſubject in this and the former addreſs, as well as the body of evidence they contain in ſupport of the domeſtic origin of the yellow fever, will recommend them to the peruſal of all who ſeek information on that topic.

ART. X. *An Inaugural Diſſertation on the Principle of Animation; read and defended at a public Examination, before the Hon.* John Wheelock, *LL. D. Preſident, and the Governors of Dartmouth College, for the Degree of Batchelor in Medicine, July* 18, 1799. *By* Daniel Adams, *A. B. Hanover (N. H.)* Davis. 1799. 8vo. pp. 27.

IN this Diſſertation Mr. Adams rejects the opinion, that the principle of animation is an etherial ſpirit of ſuch extreme ſubtilty as to pervade indifferently all bodies; as likewiſe the notion of its being a ſecretion of the brain. Nervous fluid,

igneous fluid, electric fluid, and ſpirit of animation, are all excluded from their pretenſions to be the prime movers of the animal machine.

He thinks irritability the characteriſtic of life; that life is manifeſted by the performance of certain functions; and that vital functions cannot be carried on without OXYGEN. This is, therefore, the *ſine qua non* of animal and vegetable life, which the embryo of viviparous animals receives from its parents; of oviparous creatures, through their ſhells and membranes, from the atmoſphere; and which vegetating ſeeds and adult animals derive from the ſame ſource. In all theſe particulars he adheres to the more probable doctrines of the day.

Throughout this Diſſertation there is an ingenuous ſpirit which we approve; and a turn for experimental inquiry is manifeſted, which promiſes greater things if properly cultivated.

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

Plan *for* Observations *on the* Weather, Seasons, *and* Physical Phenomena.

THE Hiſtory of Peſtilence, juſt publiſhed by Mr. Webſter, exhibits, among various other curious and inſtructive particulars, a connection or contemporaneouſneſs of volcanic diſcharges and drought in ſummer, and cold, ſnow and hail in winter. Theſe phyſical phenomena, indicating great commotions and changes in the earth and its atmoſphere, are found to have a near connection with that general vitiation of the air which precedes and cauſes epidemic diſtempers. For obtaining, therefore, a full and complete knowledge of theſe plagues, in their varied forms of influenza, catarrh, meazles, ſore-throat, dyſentery, fever and peſtilence, he judges that our knowledge of natural phenomena ſhould be enlarged, by collecting facts and recording obſervations touching all theſe great events taking place on our globe. Impreſſed with theſe views of the ſubject, the Connecticut Academy of Arts and Sciences paſſed the following vote at a late meeting:

"*Reſolved*, That this Academy will endeavour to collect and preſerve, for publication, a regular ſeries of facts, reſpecting the following phenomena of nature: the variations of the thermometer and barometer—extraordinary changes of weather, and ſtorms of all kinds—ſtate of the ſeaſons—unuſual tides—celeſtial appearances—earthquakes—unuſual numbers of inſects—commencement, progreſs, and termination of epidemic diſeaſes among men and other animals—and other remarkable phyſical phenomena—noting, in all caſes, the preciſe time when any extraordinary occurrence begins and ends: that, for this purpoſe, a regiſter be kept, in which ſhall be entered every day in the year with a large blank."

There is reaſon to believe, that too much time and talent have been ſpent, within the laſt twenty years, in making ex-

periments, deviſed, and often very badly, by the human head. Nature is the beſt experimenter; but the experiments which ſhe makes want OBSERVERS and INTERPRETERS. To *obſerve* and *interpret nature* is the way to be truly wiſe and ſcientific. For theſe purpoſes *facts* muſt be collected, and from different parts of the earth. With a due portion of the ſpirit which actuated Ariſtotle, Pliny and Bacon, a vaſt deal might be done in America, at this eventful time, in a few years. We hope ſoon to hear that the example of Connecticut is followed; and that Albany, Boſton, New-York, Providence, Philadelphia, Baltimore, Norfolk, Newbern, and Charleſton, will vie with each other in the correctneſs of their regiſters. Profeſſor Meigs, who, we underſtand, began the ſeries of obſervations on the firſt day of January, 1800, at New-Haven, notes the indication of the quickſilver in the thermometer thrice a day, at ſun-riſe, at two o'clock afternoon, and at ſun-ſet; the firſt being the coldeſt, the ſecond the warmeſt, and the third the mean temperature of the natural day. A blank leaf is left in the book after each day, for the purpoſe of entering *hereafter*, in its place, any ſingular or memorable events in any part of the earth, however diſtant—ſuch as earthquakes, volcanic eruptions, great tempeſts, or other atmoſpherical commotions—local or general ſickneſs among the human ſpecies or brute animals, the multiplication of inſects and reptiles, the prevalence of drought, the occurrence of hail, and all other phyſical appearances. It is to be deſired that the gentlemen who undertake to keep ſimilar records of ſuch events, in different parts of America, may conform, as nearly as poſſible, to this plan; that thereby a compariſon of the different regiſters may be more eaſily and exactly made.

NEWLY-INVENTED VIBRATING STEELYARD.

A ſteelyard has been invented by Mr. Benjamin Dearborn, of Maſſachuſetts, in which the centre of motion, centre of gravity, and points of ſuſpenſion, are ſo adjuſted, that the beam vibrates like a ſcale-beam, when loaded with weights in equilibrium, and when unloaded. He has obtained a patent for his invention, under the title of the "vibrating ſteelyard." Beſides the advantages of the common ſteelyard, Mr. D.'s inſtrument poſſeſſes the property of being ſtrictly accurate: it has but two hooks; never requires to be reverſed; has the poiſes adjuſted to *certain* weights, which may be ſealed

like other weights; gives, by inſpection, both *neat* and *groſs* hundreds; and may be purchaſed at a moderate price. Such an improvement in determining the weight of articles bought and ſold, ought to attract the notice of houſe-keepers and dealers of every deſcription, as it is ſaid to poſſeſs great advantages for weighing *with eaſe, diſpatch and certainty.*

Mathematics and Physics.

We learn that Jared Mansfield, of New-Haven, intends to publiſh a collection of eſſays, mathematical and phyſical, in which, among other ſubjects, there will be a diſſertation on the negative ſign in algebra, with an explanation of the mathematical limits of *nothing* and *infinity*; a *theory of fluxionary analyſis*, and *an explanation of the moon's theory.*

Agricultural Society of New-York.

A *fourth* number of the Tranſactions of the Society for promoting Agriculture, Arts and Manufactures, is now in the preſs: it will probably be completed in the courſe of the winter. This publication will be a ſequel of the piece noticed in our Review, Med. Repoſ. vol. ii. p. 315. The collections of this ſociety have hitherto been printed at the expenſe of the State, purſuant to concurrent reſolutions of both houſes of the Legiſlature, and diſtributed to the citizens in the ſame manner that copies of the laws and legiſlative journals are. This is an eaſy and economical mode of diffuſing hints, ſpeculations, experiments and improvements, and well worthy of imitation by the Legiſlatures of our ſiſter States.

Produce of Maize, or Indian Corn.

The varieties of this valuable grain are become very numerous. Its vegetative powers are found to be admirably adapted to the diſtant climates of Nova-Scotia and the Carolinas, on the American continent. Farmers are not agreed which variety of the grain is moſt productive. Each ſoil and latitude undoubtedly has its particular and preferable ſort of maize. We mention, however, for the information of our readers, a kind of Indian corn which grew laſt ſeaſon on Manhattan Iſland, at Haerlem. The ear contained *ſixteen rows* of grains. Theſe were well ripened, of a middling ſize, and of

a very firm ſtructure. Not a row contained leſs than *fifty grains*. So that the product of the ſingle ear of maize was more than *eight hundred grains*. It is ſubmitted to the conſideration of farmers, whether the cultivation of this variety would not anſwer an important purpoſe in huſbandry.

Midwifery.

Dr. V. Seaman, phyſician extraordinary to the lying-in ward in the Alms-Houſe of New-York, who has been, as our readers will recollect (Med. Rep. vol. ii. p. 437), engaged, during the laſt year, in giving obſtetrical inſtruction *to females*, intends ſoon to publiſh a ſyllabus of his lectures, and a ſummary of the practical matter they contain, for the information of midwives and mothers, in a conciſe, plain, and eaſy manner.

Remedy for Scirrhus and Cancer.

The citizens of the United States, eſpecially thoſe of the State of Pennſylvania, have often heard of Dr. Tate, and his ſecret remedy for ſcirrhous and cancerous tumors. William Torbert, now of New-York, having become poſſeſſed of the method which Tate purſued, has, for a conſiderable time, practiſed it in the city and its vicinity; and, evidently, with more ſucceſs than attends the adminiſtration of the uſual remedies. He employs both internal and external means, according to the circumſtances of the caſe, but makes no uſe of the knife.

Cure of Gonorrhœa Virulenta *by Soap-Injection.*

Dear Sir, *New-York Hoſpital, Feb.* 5, 1800.

Incloſed I ſend you an abſtract of the four caſes of gonorrhœa which you treated in the Hoſpital; from it you will eaſily recollect the particulars of each. Dr. Rodgers, knowing the inefficacy of the common remedies, has alſo been induced to make trial of *thoſe* which you preſcribed. The reſult of the only three caſes that occurred, which I likewiſe ſend you, will beſt teſtify whether *they* were entitled to his confidence. With much reſpect,

I am, Sir, yours, &c.

SAMUEL HAYES,
Apothecary to the Houſe.

Samuel L. Mitchill.

The injection uſed in the following caſes was a ſolution of Caſtile ſoap ʒ ij. in hot water ℥ v. with directions to be uſed from ſix to ten times a-day. A piece of ſoap and ſponge was ordered for them to keep the parts clean; and the ulcers and incipient chancres, in the caſes in which they are mentioned, were touched, twice a-day, with a camel's hair bruſh, dipped in the deliqueſcent carbonate of pot-aſh.

Thomas Colwell, a ſeaman, aged thirty-ſix years, was admitted on the 7th of November, with virulent gonorrhœa, of about thirteen days ſtanding. The preputium was conſiderably inflamed and ſwoln, amounting almoſt to phymoſis. He was of a coſtive habit of body, and was, therefore, put upon the uſe of the following cathartic; viz. jalap gr. iij. calom. gr. i. made into a pill with lenitive electuary. They had the deſired effect. He was diſcharged, cured, on the 23d of the ſame month, without the appearance of any other unpleaſant ſymptom.

Jonathan Dawſon, mariner, aged twenty years, was admitted, on the 5th November, with virulent gonorrhœa, phymoſis, and much tumefaction of the prepuce. On the 7th there appeared to be ſome affection of the inguinal glands of the right ſide, and it is noted that he complained of coſtiveneſs. He was directed to take two of the above pills of calom. and jalap every day. On the 12th the pills were omitted, he being ſlightly ſalivated; and, on examination, it was found that he had been plied with mercury previous to his admiſſion. When the diſeaſe was ſo far reduced that the prepuce could be retracted, there was found in its fold on the right ſide, juſt behind the glans, a deep and foul ulcer, and two ſmaller ones were near it. Theſe were touched with the deliqueſcent carbonate of pot-aſh, and were ſoon healed. The bubo never came to ſuppuration. He afterwards gradually mended; and, though he was known to be frequently intoxicated, he was cured, and diſcharged on the 22d January.

William Collins, mariner, aged twenty-four years, was admitted, on the 19th November, with virulent gonorrhœa, and ſome inflammation and incipient chancres on the prepuce and glans penis. To obviate coſtiveneſs, he uſed now and then a cathartic of ſulphate of ſoda—no other was given. On the 6th of December he was well, and diſcharged cured.

Robert Sparks, a ſeaman, aged twenty-nine years, was admitted into the Hoſpital on the 12th November, and the following note was taken of his caſe:—Venereal poiſon of about

ſix days ſtanding, with ſcalding and blennorrhœa, inflammation of the glans penis, retraction and tumor of the prepuce, and incipient chancres. Theſe, though pretty extenſive and numerous, were quickly healed: but from ſome miſmanagement, either in the uſe of the ſyringe or injection, or from ſome other cauſe, he was, on the 1ſt of December, affected with hernia humoralis. This was relieved by the uſual means, and he gradually mended afterwards, and was, by his own deſire, diſcharged December 22d. It is but juſtice to obſerve, that this man was much accuſtomed to walk out, and almoſt every morning practiſed it. He alſo frequently indulged in draughts of gin, either from love of it, or an unhappy perſuaſion that it would relieve his complaint.

—

The three following caſes, under the care of Dr. Rodgers, were put upon the ſame remedies, excepting only that the ſolution was a little more dilute.

Daniel M'Bride, aged twenty, and Peter Peterſon, aged twenty-four years, ſeamen, each of an athletic habit of body, contracted the diſeaſe on the ſame night, which was about twelve days previous to their admiſſion on the 24th of December. Each had conſiderable running and ſcalding, with inflammation, and M'Bride had an ill-conditioned ulcer on the prepuce. In one of them the injection ſeemed to increaſe the ardor urinæ. This effect, however, was but momentary. Both mended rapidly, and were diſcharged cured, M'Bride January 14th, and Peterſon January 17th.

Elizabeth Marſhall, aged twenty-two years, admitted on the 14th January, was ordered to uſe the ſaturnine injection, for gonorrhœa virulenta, with which ſhe had been ill about a fortnight. From the happy iſſue of the preceding caſes, this injection was, on the 17th, changed for the ſolution of ſoap, which ſhe has ſince been in the uſe of, and to it ſhe aſcribes her cure, which is now (Feb. 5th) completed.

In point of cleanlineſs, this practice ſuffers nothing from compariſon with every other. None of the preceding caſes had any excoriations produced on the neighbouring parts from venereal virus lodged in them; on the contrary, the remedies always removed ſuch as were preſent. The ſurface of the ulcers was never left extended by the ſloughing off of ſubſtance deſtroyed by the deliq. carb. pot-aſh: they were uniformly kept clean, and in a healing condition. It may not

be improper to add, that of the above cafes there has been no re-application for admiffion, with a return of any of the fymptoms.

SINGULAR EFFECTS *of* GASEOUS OXYD *of* SEPTON *(dephlogiſticated Nitrous Air).*

Northumberland, Jan. 30, 1800.

Dear Sir,

I fend you an extract from a letter juſt received from my fon in England, thinking it will gratify yourſelf, and the readers of the Medical Repoſitory.

"Mr. Watt deſired me to tell my father, that he has completely got the better of his aſthma, by breathing dephlogiſticated air, and he is in much better health in every reſpect. They are adminiſtering *dephlogiſticated nitrous air* to two paralytic patients, one of whom is nearly cured. It excites the nervous ſyſtem in a wonderful manner. Some that take it are thrown into fits of laughter, others into the moſt antic geſtures, affecting them much in the ſame way as if they were intoxicated, and in ſome it produces a ſtate of inſenſibility."

I have now in the preſs a work which I venture to entitle, *The Doctrine of Phlogiſton eſtabliſhed, and that of the Compoſition of Water refuted.* It contains all that I have hitherto publiſhed on the ſubject, with conſiderable additions. In this I may be ſaid, in the language of the preſent war, to have *made an attack on the whole line* of my opponents. As this war will probably laſt longer than that in Europe, I am glad to find my antagoniſts in ſuch cool, good temper, eſpecially Dr. Maclean, whoſe feelings I am ſorry to ſeem to have hurt, though I think he gave the occaſion. In candour and civility I will endeavour not to be exceeded by any perſon. Truth is, or ought to be, our common and only object. Your Repoſitory is the theatre of the conteſt, and I hope it will not be diſgraced by the illiberality of any writer in it.

With much reſpect, I am, dear Sir,
Yours ſincerely,

J. PRIESTLEY.

Dr. MITCHILL.

At a ſtated meeting of the Academy of Medicine, in Philadelphia, the following perſons were elected officers of the inſtitution:

Dr. Philip Syng Phyſick, Preſident.
Dr. Charles Caldwell, } Vice-Preſidents.
Dr. William Dewees, }
Dr. John C. Otto, Secretary.
Dr. James Gallaher, Librarian.
Dr. William Budd, Treaſurer.

The following perſons were appointed members of the ſtanding committees:

Drs. Charles Caldwell, William Dewees, James Meaſe, Felix Paſcalis, James Reynolds, } Committee of Correſpondence.

Drs. John Redman Coxe, John C. Otto, James Stewart, René La Roche, } Committee of Meteorology.

Drs. Benjamin Ruſh, Philip Syng Phyſick, Joſeph Strong, } Committee of Reviſion.

Drs. William Budd, James Gallaher, Iſaac Heylin, } Committee for Annual Bills of Mortality.

PHILOSOPHICAL SOCIETY *of the* STATE *of* DELAWARE.

Since the commencement of the preſent year, a number of gentlemen at Wilmington, in the State of Delaware, animated with the ſpirit of cultivating and diſſeminating a knowledge of the ſciences, have aſſociated themſelves, framed and organized a conſtitution, under the title of the "Philoſophical Society of the State of Delaware." The names of the officers are not yet come to hand.

A Deſcription of a Cement for preſerving Wood and Brick from Decay, and for ſtopping Leaks and Fiſſures in any Body to which it ſhall be applied; and of the Manner of uſing, and of the Proceſs of compounding the ſame. By the Rev. Silas Conſtant, *and ſecured to him by Patent.*

The compoſition, or cement, is compoſed of the following materials; viz. tar, pulverized coal (charcoal is eſteemed the beſt), and fine, well ſlacked lime; the coal and lime to be

well mixed together, proportioned at about four fifths coal and one fifth lime; the tar to be heated, and, while hot, thickened with the mixture of coal and lime, until it becomes ſo hard as that it may be eaſily ſpread upon the ſurface of a board, and not run off when hot. Turpentine or pitch will anſwer nearly as well as tar, and plaſter of Paris will anſwer inſtead of lime; to be uſed in the ſame manner, and about in the ſame proportions. The cement muſt be applied when warm, and is found to be uſed eaſieſt with a trowel.

PRIESTLEY'S SENTIMENTS *on the* DOCTRINE *of* SEPTON.

In his letters, particularly one of July 24, 1799, that celebrated philoſopher wrote from Northumberland, to Dr. Mitchill, thus: "I have no doubt of your having made a moſt important diſcovery, which ranks with the moſt brilliant that this age, fertile in diſcoveries, can boaſt, that the cauſe of contagious fever is of an *acid* nature, and ſome modification of the *nitrous*, which may, properly enough, be called *ſepton*," &c. &c.

Diſcovery of Septic Acid in the Alimentary Fæces of a Perſon deſperately ſick of Yellow Fever.

Among other particulars of a wretched caſe of yellow fever occurring in a man who had been expoſed to the vitiated air of the city of New-York, during the autumn of 1799, and who ſickened afterward in Clinton-Town, in Dutcheſs County, J. E. R. Birch, the attending phyſician, has written an account of the following experiments to Dr. Mitchill, in a letter dated Clinton, Feb. 11, 1800. The facts are the more memorable, as few perſons, though poſſeſſed of a philoſophical ſpirit, have determination and firmneſs enough to collect them from ſuch ſources.—"Hæmorrhages became frequent from his noſe. I obſerved that what he now diſcharged by ſtool was of the colour and conſiſtence of half-made (ſoft or black) ſoap, and was ſo extremely corroſive that it excoriated the ſkin wherever they came in contact. Immediately on diſcovering this, an injection of milk, recently taken from the cow (as nothing better could be procured in the place where the patient was at that time), was adminiſtered. He was unable to receive the whole of the injection, but parted with it in the act of receiving it. What he diſcharged came away

in the ſtate of perfect whey and curd; or, in other words, the ſerous part was perfectly ſeparated from the coagulable. Surprized at the ſtrength of the acid in his inteſtines, I repeated the injection, and the ſame effects were again obſervable. A few hours after he paſſed another ſmall ſtool, to which I added a ſmall quantity of aërated ſal ſodæ, and an effervescence enſued. I was now convinced that an acid more highly concentrated than I had hitherto ſuppoſed the inteſtinal canal poſſibly capable of containing, without deſtroying its organization or texture, really exiſted within his. The only queſtion that now remained was *its kind.* To determine this, I immerſed ſeveral pieces of linen cloth in one of his ſtools; and, after they had been gently dried, ſet them on fire. The brightneſs and colour of the flame, together with its dancing motion, tallied ſo exactly with the appearance obſervable in the combuſtion of bodies impregnated with nitre, that I readily concluded it to be of the ſeptic (nitric) quality. I am convinced theſe plain facts will go further to ſubſtantiate your ingenious doctrine of fever, than," &c. &c.

Decompoſition of Soap-ſuds by the Septic or Peſtilential Air of New-York, in 1798 *and* 1799.

J. N. Cowan, Doctor of Phyſic in the city of New-York, in a note to Dr. Mitchill, has written thus, January 21, 1800: —"I obſerved, in the time of the fever in 1798, that, in Veſey-ſtreet, a ſtrong lather of ſoap in water was decompoſed, in my lodgings, in the ſpace of three hours; and the ſeparation of the ingredients of the ſoap was ſo effectual as to require boiling water to detach the tallow from the baſon. In October, 1799, I was determined to try the experiment more fully. At the houſe No. 61 in John-ſtreet, I made a baſon full of ſuch lather of ſoap and water, and divided it into five parts. The houſe is three ſtories high, and the ground whereon it ſtands is about fifty feet above the level of the ſea. On the floor of each ſtory I placed a tea-ſaucer full. On the ground floor, and in the ſecond ſtory of a houſe in Water-ſtreet, I alſo placed ſaucers full of the ſolution of ſoap. The portion placed on the ground floor in John-ſtreet was decompoſed in ſix hours; that on the ground floor in Water-ſtreet in four hours; and all the reſt were decompoſed in times proportioned to their altitudes, as nearly as I could compute. To this acidity, which robs the ſoap of its alkali,

and ſuperabounds in the city-atmoſphere during the prevalence of yellow fever, I have aſcribed the peſtilence of the ſeaſons. As the *ſeptic* acid was not known or talked of at the time I received my medical education, I at firſt attributed the phenomenon entirely to the *carbonic* acid; but it appears to me now that *both* have their ſhare in producing the effect." It is deſerving of remark, that the fact of the ſpeedy decompoſition of ſolutions of ſoap in water, is confirmed by the obſervations of the waſher-women in the city of New-York, during the ſickly months in *ſummer and autumn*.

SEPTIC ACID VAPOURS EXTRICATED FROM CORRUPTING BEEF.

The Inſpector-General of beef and pork in the city of New-York, examined, during the ſummer and autumn of 1799, ſeveral thouſand barrels of corrupting meat. Much of this had been packed originally with too ſmall a quantity of the muriate of ſoda (common ſalt), and by bad citizens, who, in various ways, evaded the law of the commonwealth preſcribing the mode of curing proviſions for exportation. He employed, during the ſeaſon, forty perſons, including himſelf and his deputies, in inſpecting, repacking, and new-ſalting theſe articles of human food. They all obſerved, that when beef was about to ſpoil it became *ſour*, and that a manifeſt *acidity*, of a diſagreeable flavour, and very plainly to be *taſted*, was imparted to the pickle thus under-ſaturated with ſea-ſalt. On unheading the barrels, the exhalations from the meat in this ſtage of putrefaction were four to be ſmelled, as they roſe and ſpread in the atmoſphere. It was not until the ſourneſs had continued ſome time (perhaps ſeveral days, according to the quantity of the ſalt preſent), that the fœtid and truly ſtinking odour was extricated from the corrupting fleſh. This ſenſible *acidity* was formed principally on the *lean*, and not on the *fat*—from the *beef* much more copiouſly than from the *pork*. Afterwards the ſour fumes and the ſtinking vapours were formed and extricated together; though their acidity was commonly loſt, as far as reſpected ſenſation, in the more copious and obvious fœtor which attended. Theſe remarks on the acid quality of the putrefying fleſh, and of the gas flowing from it, correſpond with the obſervation of a number of citizens, that in 1798 the poiſonous exhalation from the obſtructed ſewer opening into Burling-ſlip, which killed

many of the neighbours who lived to leeward, was ſo ſour as to be ſmelled through the air; for into this ſewer had the putrid pickle of much corrupting beef been diſcharged for ſeveral preceding days. The acidity which, in the caſe of the proviſions, ſo ſenſibly affected the tongue and noſtrils, had been apparently formed by a junction of oxygen with ſepton, the azotic baſis of the meat. The effects next to be related cannot be properly aſcribed either to the carbonic or phoſphoric acids.

Where the ſkin of the hands of theſe repackers had been ſcratched or lacerated by the ends of bones, the acid liquor to which theſe little wounds were expoſed cauſed more than uſual ſoreneſs, with inflammation and difficulty of healing. Some of the putrid pickle, which accidentally was ſpilled upon the broken ſhin of one of the men, excited high inflammation, with ſo great lameneſs as to confine him. Such was the operation of ſeptic acid, even when mingled with a weak ſolution of the muriate of ſoda, and, of conſequence, in ſome meaſure neutralized or blunted by its alkali.

But this was not all: Of the forty men ſo acted upon by the ſeptic acid vapours and pickle, thirty-eight (the Inſpector-General himſelf being one) were afflicted with dyſenteries of various degrees of violence. And, beſides pains in the belly, teneſmus, and bloody ſtools, a conſiderable part of them experienced redneſs of the eyes, and other catarrhal ſymptoms, nauſea, and that condition of the arterial ſyſtem called fever. —Where is the uſe or propriety of the term "*nitrous*" or "*nitric*," applied to this acid, which never had been aſſociated with the fixed vegetable alkali into nitre?

MATTER *of the* VACCINE DISEASE *for* INOCULATION.

Dr. George Pearſon, of London, in a letter to Dr. Miller, juſt received, has obligingly tranſmitted a thread impregnated with the matter of the vaccine diſeaſe, for the purpoſe of inoculation in this country, with a view to its uſe as a ſubſtitute for the ſmall-pox.

In the ſame letter Dr. Pearſon mentions, that Mr. Tennant has lately diſcovered that certain limeſtones, which afforded lime deleterious to vegetation, contain a pretty large portion of magneſia alba; but that thoſe which are known to fertilize land contain none at all: that he has alſo proved the cauſe to be the magneſian earth, by experiments of ſowing ſeeds in ſoils containing the different kinds of calcareous earths.

MEDICAL INTELLIGENCE FROM FRANCE.

By a letter from France, dated September 5th, 1799. to Dr. Mitchill, we learn that Mr. Adet, the ci-devant Minister of that Republic to the government of the United States, had been lately appointed a Professor of Physic in the School of Paris, and had given up diplomatic affairs. His competitor was Valentin, formerly of Cape-François, over whom he prevailed by a small number of votes.—A parcel of French pamphlets were sent on to us by the conveyance which brought the letter.

From " THE TIMES," *a Newspaper printed in Alexandria (Virginia), dated in December,* 1799.

Messrs. J. & D. Westcott,

Presuming that some account of the late illness and death of General WASHINGTON will be generally interesting, and particularly so to the professors and practitioners of medicine throughout America, we request you to publish the following statement.

JAMES CRAIK,
ELISHA C. DICK.

Some time in the night of Friday the 13th instant, having been exposed to rain on the preceding day, General Washington was attacked with an inflammatory affection of the upper part of the wind-pipe, called in technical language, *cynanche trachealis*. The disease commenced with a violent ague, accompanied with some pain in the upper and fore part of the throat, a sense of stricture in the same part, a cough, and a difficult rather than a painful deglutition, which were soon succeeded by fever and a quick and laborious respiration. The necessity of blood-letting suggesting itself to the General, he procured a bleeder in the neighbourhood, who took from his arm, in the night, twelve or fourteen ounces of blood: he would not by any means be prevailed upon by the family to send for the attending physician till the following morning, who arrived at Mount Vernon at about eleven o'clock on Saturday. Discovering the case to be highly alarming, and foreseeing the fatal tendency of the disease, two consulting physicians were immediately sent for, who arrived, one at half after three, the other at four o'clock in the afternoon. In the interim were employed two copious bleedings; a blister was applied to the part affected, two moderate doses of calomel were given, and

an injection was adminiſtered, which operated on the lower inteſtines—but all without any perceptible advantage; the reſpiration becoming ſtill more difficult and diſtreſſing.—Upon the arrival of the firſt of the conſulting phyſicians, it was agreed, as there were yet no ſigns of accumulation in the bronchial veſſels of the lungs, to try the reſult of another bleeding, when about thirty-two ounces of blood were drawn, without the ſmalleſt apparent alleviation of the diſeaſe. Vapours of vinegar and water were frequently inhaled, ten grains of calomel were given, ſucceeded by repeated doſes of emetic tartar, amounting, in all, to five or ſix grains, with no other effect than a copious diſcharge from the bowels. The powers of life ſeemed now manifeſtly yielding to the force of the diſorder. Bliſters were applied to the extremities, together with a cataplaſm of bran and vinegar to the throat. Speaking, which was painful from the beginning, now became almoſt impracticable; reſpiration grew more and more contracted and imperfect, till half after eleven o'clock on Saturday night, when, retaining the full poſſeſſion of his intellect, he expired without a ſtruggle.

He was fully impreſſed at the beginning of his complaint, as well as through every ſucceeding ſtage of it, that its concluſion would be mortal, ſubmitting to the ſeveral exertions made for his recovery rather as a duty than from any expectation of their efficacy. He conſidered the operations of death upon his ſyſtem as coeval with the diſeaſe; and ſeveral hours before his deceaſe, after repeated efforts to be underſtood, ſucceeded in expreſſing a deſire that he might be permitted to die without interruption.

During the ſhort period of his illneſs he economized his time in the arrangement of ſuch few concerns as required his attention, with the utmoſt ſerenity, and anticipated his approaching diſſolution with every demonſtration of that equanimity for which his whole life had been ſo uniformly and ſingularly conſpicuous.

JAMES CRAIK,
Attending Phyſician.
ELISHA C. DICK,
Conſulting Phyſician.

The ſignature of Dr. Guſtavus Brown, of Port-Tobacco, who attended as conſulting phyſician, on account of the remoteneſs of his reſidence from the place, has not been procured to the foregoing ſtatement.

FOREIGN.

THE laſt number of the *Annales de Chymie* preſents us with an intereſting memoir on the combuſtion of the diamond, by GUITON (Morveau), which throws conſiderable light on its compoſition, and verifies the important experiments made by Lavoiſier and Tennant.—The diamonds employed in theſe experiments were taken on board an Engliſh ſhip coming from Senegal, and being in the rough, and not fit for the jeweller, a part of them was given to the Polytechnic School, by order of government, out of which were taken the two that were the ſubjects of theſe experiments. The combuſtion was performed in oxygen gas, by means of the ſolar light, and all proper attention was paid to the accuracy and purity of the gas employed. In the firſt experiment, the large lens belonging to the Polytechnic School was employed; and in the ſecond, that of Tſchirnhauſen. The circumſtances of combuſtion were the following:—The diamond at firſt became black, and of a coaly appearance; then, as the heat increaſed, the blackneſs was ſucceeded by luminous points, boiling up, as it were, through the blackened part, till it was beautifully tranſparent throughout, and with ſomewhat of a metallic luſtre, till the diamond was totally conſumed. If at any time the ſun's rays were intercepted, it appeared of a glorious red, but which ſoon went off; and it grew cold without being able ſpontaneouſly to continue the combuſtion, and, when cold, remained beautifully tranſparent. During the combuſtion (which was carried on at intervals for ſome days), the angles of the diamond were gradually rounded off, and melted down, as it were, till the octahedral form was no longer diſtinguiſhable; but it continued tranſparent to the laſt particle. The air remaining in the veſſels after the combuſtion, aſſayed by barytic lime-water, ſhewed a large production of carbonic acid, and (what is remarkable in this experiment) this acid, inſtead of being compoſed of 28 of carbon, and 72 of oxygen, as is the caſe with common charcoal, ſhewed a compoſition of 17.88 of diamond, and 82.12 of oxygen. From this important reſult it would appear, that the diamond is a carbonaceous ſubſtance, much richer in combuſtible matter than charcoal, as it requires a much greater quantity of oxygen for the production of an equal quantity of carbonic acid; for if the above numbers are re-

duced to unity, it will be found that one part of charcoal abſorbs in combuſtion 2.527 of oxygen, and produces 3.575 of acid: whereas, 1 part of diamond abſorbs 4. of oxygen, and gives 5. of acid. From the leaden colour which the diamond aſſumed in the courſe of combuſtion, the author ſuppoſes a partial converſion into plumbago, which is intermediate between the diamond and charcoal, as to the quantity of oxygen abſorbed in combuſtion, and the heat required for this proceſs. The carbonaceous mineral *anthracolite*, or *carburet of alumine*, reſembles plumbago in this reſpect. Therefore the author concludes, that diamond is the pure carbonaceous principle; and this, in a low degree of oxygenation, produces plumbago, anthracolite, and the different ſpecies of difficultly combuſtible coals; in a higher degree, common charcoal; and, in complete oxygenation, carbonic acid. Of theſe, the pureſt carbon is that which requires the higheſt heat for combuſtion; and, therefore, diamond and plumbago, even when fully ignited, cannot continue to burn when the igniting heat is removed. This difficulty of oxygenation reſembles that of azote, which, when pure, requires the electric ſpark, or ſome very powerful agent, to produce oxygenation; but when partly oxygenated, in the form of nitrous gas, requires only the mere contact of oxygen to produce a full ſaturation. [*Monthly Mag.* vol. viii. p. 732.

The Rev. Mr. Senger, of Reck, in Weſtphalia, has diſcovered a new ſubſtance for making paper. It is taken from the aquatic plant, called by Linnæus *conferva rivularis* (Eng. crow-ſilk), a vegetable very plentifully growing in all European rivers. The inventor having ſpent many years in making experiments, and perfecting his diſcovery, is now publiſhing a circumſtantial account of it; from which it appears that the above material furniſhes as excellent paper as that obtained from rags, and at leſs expenſe. [*Ibid.* p. 731.

The plague, a ſcourge in the train of ſlavery, which deſolates the frontiers of Turkey, but which may find too many opportunities of eloping from its boundaries, from the general movements wherewith Europe is at preſent agitated, ought to excite, more than ever, the attention of philoſophers and the vigilance of governments. What are the means of combating or of ſuppreſſing this ſcourge? Such is particularly the queſtion on which citizen Papon has been,

occupied in a work, a ſketch of which he has offered to the claſs. In tracing the origin of the plague, the author obſerves, that Egypt was unacquainted with it in thoſe glorious and happy ages, when the borders of the Nile were rendered, by the arts and ſciences, the moſt fertile and populous country on the globe. It was in Europe, and eſpecially in Italy, that this ſcourge was then indigenous and endemial. It was ſeen to ravage the Roman territory five-and-twenty times during the firſt five ages of the republic; during the two following it became more rare in proportion as civilization improved; it appeared again under the laſt emperors; recommenced with them the ages of barbariſm, and devaſtated, a long time, the fineſt countries in Europe, till the epoch in which the arts reviving, extinguiſhed, a ſecond time, the germs of contagion, or baniſhed them to the coaſts of uncultivated Africa. [*Ibid.* p. 710.

Dr. Pearſon has lately publiſhed a paper, entitled, "A Statement of the Progreſs in the Practice of the Vaccine Inoculation, and Trials to determine ſome important Facts relating to the Vaccine Diſeaſe." From this communication we learn,

1. The proportion of deaths by the vaccine diſeaſe to be one in about 2000 already inoculated, and in the ſmall-pox the proportion is eſtimated at ten times this number of deaths, or one out of 200.

2. That no eruptions like the ſmall-pox have been ſeen by the author, or are ſtated in the accounts ſent to him during the laſt four months.

3. That although, in many caſes, the cow-pox by inoculation is a more ſevere diſeaſe, and attended with more alarming ſymptoms than was originally repreſented, yet, in general, it is a far ſlighter diſeaſe than the inoculated ſmall-pox.

4. That neither in his own practice, nor in that of his correſpondents, have any bad conſequences enſued from the inflamed arms, although, in ſome caſes, the eryſipelatous, or, as Dr. Pearſon calls it, *erythematous* affections were very formidable. In particular he ſtates, that the conſtitution was very little diſordered, when almoſt the whole arm was covered with erythema; and that this affection, without any applications, or merely ſedative ones, ſpeedily diſappeared.

Dr. Pearſon has the ſatisfaction of announcing, that the vaccine inoculation has occaſioned a conſiderable ſenſation in Germany, and that ſome of the principal phyſicians at Vi-

enna, viz. Dr. De Carro and Dr. Ferro, have already inoculated their own children with matter tranſmitted by himſelf; that Dr. Frank propoſes to ſubſtitute the cow-pox for the ſmall-pox in his inoculation practice.

Dr. Pearſon expects ſoon to receive accounts from Portugal. In Scotland nearly one hundred perſons have been inoculated by Dr. Anderſon; and Dr. Pearſon finds that the practice is extending rapidly in that country.

But the moſt curious part of this paper is that concerning his *trials* to obtain ſome uſeful determinations reſulting from experience.

1. It is known that the ſmall-pox renders the conſtitution unſuſceptible of this diſeaſe a ſecond time.

2. It ſeems now proved, that the cow-pox renders the conſtitution unſuſceptible of the ſmall-pox.

3. Dr. Pearſon ſhews, by experiments, that perſons who have had the *ſmall-pox* cannot take the cow-pox, contrary to Drs. Jenner and Woodville.

4. It might hence be concluded, that a perſon who has undergone the cow-pox is unſuſcepible of the cow-pox a ſecond time; but although the preceding propoſitions ſeem to demonſtrate this laſt fact, Dr. Pearſon does not truſt to reaſoning, but determines it by obſervations. [*Med. & Phyſ. Journal.*

In the ſeventh number of the "Medical and Phyſical Journal," we find the following communication from Mr. Thomas Henry, of Manchester.

The uſe of digitalis purpurea, in pulmonary diſeaſes, has, for ſome years paſt, been no novelty in this town; and the gentlemen who have employed it, have commonly joined it with opium—a combination by which the inconveniences of the two medicines, often experienced when they are given ſeparately, are happily corrected. Perhaps the Materia Medica contains no remedy which affords more relief to, and which even cures, harraſſing coughs, attended with inflammatory ſymptoms, that often induce phthiſis, than the digitalis; though I cannot ſay I have ever known phthiſis, when really formed, to be removed by it.—From its remarkable effects in diminiſhing the force of the arterial ſyſtem, Dr. Ferriar was led to adminiſter it, with great ſucceſs, in caſes of active hæmorrhage, and, by parity of reaſoning, I laſt winter employed it with advantage, in a caſe of acute rheumatiſm.

A gentleman's ſervant, of thin habit, and narrow cheſt, by careleſſly expoſing himſelf to the cold of laſt winter, was repeatedly attacked by a bad cough, which yielded to the common remedies.—On the firſt of December, by inattention to thoſe precautions of warm clothing, &c. which had been recommended to him, his cough returned, attended with acute pain in his breaſt, affecting his reſpiration ſo as to threaten peripneumony: blood, which proved ſizy, was taken from his arm; antimonials, demulcents with nitre, and aperients, were exhibited: the pain now quitted his breaſt, and attacked his ſhoulder, from whence, during the enſuing days, it removed alternately from the higher and lower limbs, attended with ſuch ſwelling of the hands and feet as clearly pointed out the caſe to be rheumatic. In addition to the above-mentioned medicines, he, on the evening of the fourth, took pulv. ipecac. c. ſcrup. j. which was repeated every night till the eighth, when, the pain increaſing in violence, the antimonials were omitted, and ten grains of the ſame powder were given every ſix hours. The remedies that had been uſed cauſed profuſe perſpiration, but without producing the leaſt abatement of his pain, and his pulſe beat 140 ſtrokes in the minute. My experience had taught me not to expect much relief from repeated bleeding in this diſeaſe, yet it ſeemed neceſſary to reduce the action of the veſſels. From the well-known efficacy of digitalis in diminiſhing the frequency of the pulſe, it occurred to me, to make trial of it on this occaſion; and the cough being very troubleſome, and pain acute, I determined to join opium with it: accordingly, at three o'clock in the afternoon, December 9th, he took a pill compoſed of opii gr. j. pulv. fol. digital. purpur. gr. ſs. On viſiting him in the evening, his pulſe was found conſiderably leſs frequent, and he thought his pain and cough not quite ſo ſevere. He was directed to repeat the pill every eight hours. The next morning all his ſymptoms were ameliorated, and his pulſe reduced to about 90. The ſame plan was therefore continued, with evident advantage, attention being paid to avoid conſtipation, till the fourteenth, when the rheumatiſm being removed, and his pulſe reduced nearly to the natural ſtandard, the digitalis was omitted, and he was ordered a decoction of bark, with antimonial wine; but his cough being at times troubleſome, he took a pill of opium and camphor twice a day, for two or three days longer. On the 18th, the cough being ſtill teazing, a bliſter was applied between the ſhoulders; and, by it, and

a continuance of the bark for a few more days, he was completely cured.

It is with pleasure I am able to bear testimony of the good effects of opiate friction, as recommended by my worthy friend, Mr. Ward, in the fifth number of your Journal.

A young lady of about thirteen years of age, much harrassed with ascarides, had been removed, on the death of a brother by typhus, from this town to Warrington. In a few days symptoms of typhus attacked her; but instead of proper measures being taken, she was encouraged to walk out; and, growing worse, her friend, with whom she had been placed, brought her, on the tenth day of the fever, twenty miles in a stage-coach, to her parents. On the evening of this day, July 28th, I visited her, and found her in a state of great irritability, with a rapid pulse, considerable heat, and fallen countenance: her bowels being constipated, she was, with great difficulty, prevailed on to take a powder consisting of calomel and James' powder, of each one grain, rhubarb and opiate powder, of each four grains. This procured three loose stools, in which a great number of ascarides were discharged: she now, with a degree of obstinacy I have seldom witnessed, protested against taking any medicine, or even any appropriate food. On the thirteenth, a diarrhœa prevailing to an alarming degree, ten drops of laudanum, concealed in a cup of coffee, were given without her knowledge; and this single dose was the only medicine which, during three days, we were able to administer. She was sinking fast, her pulse very rapid and feeble, and she had a tendency to delirium. Wine, which in this state seemed highly requisite, she positively rejected; and I despaired of being able to succeed by internal means. I therefore resolved to try the external application of opium. The following ointment was directed to be divided into two parts, and one of them to be rubbed into the thigh of the patient, by an assistant, whose hand was ordered to be covered with a soft bladder:

℞ Opii subtilissime pulv. scrup. i.
Adipis suill. drachm iij.
Camphor. scrup. ss. M. and divide in chartulas duas.

This application seemed to have some sedative effect, and was, therefore, repeated in the evening. The next morning, August 1st, I had the satisfaction to find that she had had some comfortable sleep; but the looseness recurring, we contrived to convey ten drops of laudanum again in coffee. The oint-

ment, with an increaſe of ten grains of opium, was continued; and, as ſhe appeared more compoſed, I determined to abide ſteadily by it. The good effects were each time more evident; ſleep almoſt conſtantly followed the application of the ointment, though no more laudanum was given internally; her pulſe and the intenſity of heat were gradually reduced, the diarrhœa was ſtopped, and, on the fourth day from the commencement of this treatment, ſhe began to take ſome wine, acidulated with ſulphuric acid. The friction on different parts was perſiſted in till the 8th of Auguſt, inclusively; when the urine having, for the two laſt days, depoſited a proper ſediment, and every ſymptom of fever having diſappeared, it was diſcontinued. [*Ibid.*

Case of Paralysis cured by the Inhalation of Vital Air.

Mr. Huitſon, who diſſects for Mr. Cruickſhank and Mr. Wilſon, eminent teachers in the ſchool of the late Dr. Hunter, had a paralytic affection of the right hand, which deprived him of its motion, and it felt to the other hand always remarkably cold. The paralyſis ſeemed chiefly ſeated in the muſcle of the thumb. I adviſed him the trial of electricity; and we obſerved, as well as thoſe who accompanied him, that the electric ſpark did not fly with a crackling noiſe to the paralytic muſcles. Trying a piece of dead meat, we found the ſame phenomenon. We then had recourſe to inhalation of vital air mixed with atmoſpheric, and he inhaled from ſix to eight quarts of vital air. The muſcle, now receiving oxygenated blood, afterwards caught the electric ſpark very readily, and a genial warmth was diffuſed throughout the paralytic hand. This was not a ſolitary obſervation, but conſtant; and it ſeems to me very forcibly to prove the animating principle derived from the oxygen of the air to the muſcular fibre; a principle not, as repreſented by Mayow, the moſt ſubtle, ſpiritual, and ætherial, but one that can be made obvious to our ſenſes in the form of air, adhering to the calces of metals, and capable now of being conceived even by the moſt groſs underſtandings.

The patient, I am happy to add, by this *combination* of external and internal ſtimulants, was completely reſtored, and has continued many months perfectly well. [*Philoſ. Mag.*

Dr. Carradori, in his fifteenth volume of the "*Annali di Chimica*," gives a deſcription of a very convenient apparatus for impregnating liquids with the carbonic acid; and we have only to regret that he has not furniſhed us with a more perfect and ſatisfactory account. This apparatus conſiſts of a caſk, bound with iron hoops, and large enough to contain about four pailfuls: no more than two thirds of that veſſel ſhould be filled, and a communication eſtabliſhed between it and a glaſs bottle, which contains powdered marble and ſulphuric acid. An aperture ſhould be made in the upper end of the caſk, into which a curved tube is introduced, to carry off the ſuperabundant gas. The author aſſures us, that with this apparatus a perſon may, in leſs than half an hour, ſaturate any quantity of water in proportion to the carbonic acid diſengaged.

Van Mons, who has extracted this article from the aforementioned work of Brugnatelli, obſerves, on this occaſion, that ſeveral other methods have been lately propoſed for the ſaturation of water with alkalies and the carbonic acid; but that an eſſential improvement might be made on the apparatus propoſed by the indefatigable chemiſt of Pavia, namely, by conveying the decompoſing acid on the carbonate of lime, by a ſlow inſtillation, which might be effected by paſſing the communicating tube tranſverſely over a funnel adjuſted to the mouth of the receiver. By this contrivance, a regular and gradual diſengagement of the gas will take place, none of it will be loſt, and the acceſs of atmoſpheric air prevented; which, by mixing with the gas diſengaged, neceſſarily retards the ſaturation.

It is worthy of remark, that the difficulty of procuring, in Italy, glaſs veſſels provided with more than one neck, firſt induced the author to adopt the apparatus here deſcribed. The ſaturation may be greatly facilitated by employing a ſimple gaſometer in conducting this proceſs.

[*Med. & Phyſ. Journal.*

Mr. William Higgins, of Dublin, has brought into uſe an important improvement in the proceſs of bleaching. In the ordinary proceſs, the cloth is repeatedly boiled in an alkaline ley previous to expoſure to the ſun and air, and the expenſe of the alkali is a very conſiderable object to the manufacturer. Mr. Higgins has ſubſtituted a ſolution of ſulphuret of lime, made by boiling together ſulphur and quick-lime, with a large

quantity of water; and the great cleanſing powers of this liquor render it equal to the alkaline ſolution, with a great ſaving both in the expenſe of the materials and in fuel, as the ſulphuret will anſwer equally well in the cold. Mr. Higgins eſtimates the quantity of alkali uſed at preſent in bleaching to coſt £215,307, being both pearl-aſh and barilla, and an equal quantity of ſulphuret of lime in ſolution to be prepared at ſomewhat leſs than half this expenſe, with the additional advantage of ſaving great part of the fuel, and poſſeſſing both the lime and ſulphur at home, and, therefore, ſaving the importation of all the alkali. [*Monthly Mag.* vol. viii. p. 733.

Cit. Van Mons communicates the following obſervations relative to the preparation of the black oxyds of antimony and mercury *(æthiops antimonialis)* in the humid way.

Antimony, by its combination with ſulphur, or crude antimony, very forcibly retains this combuſtible ingredient, though it be not ſufficiently ſaturated to part with it by ſimple trituration with mercury. The extinction of this metal, which was ſuppoſed to take place in the ſulphur, was, after an extremely tedious experiment, ſo far from being accompliſhed, that the reſult appeared to be a mixture conſiſting of the ſulphur of antimony and black oxyd of mercury united by air. Quarin endeavoured to remedy this defective operation, by adding ſulphur to the matter ſubjected to trituration; but this improvement tended only to abridge the labour, and afforded a ſtill more imperfect mixture of the two ſulphurs of antimony and mercury.

Van Mons propoſes to prepare the antimonial æthiops by precipitating the hydro-ſulphureous alkali of the antimony with the nitrat of mercury. To compoſe this hydro-ſulphur, twelve parts of the ſulphur of crude antimony are boiled with ſix parts of cauſtic potaſs and three parts of ſulphur, in a ſufficient quantity of water. In theſe proportions of the ingredients, the ſulphur which is formed does not occaſion any precipitate on cooling. A portion of the liquid is filtered, and examined whether the alkali is ſaturated with the antimonial ſulphur. This point being aſcertained, the liquor ſhould be precipitated in a very clear and gradual manner, by means of a ſolution of mercury in the nitric acid.

No hydrogenated ſulphureous gas is diſengaged during the precipitation, as the hydrogen is converted into water by the

portion of oxygen which the mercury ought to discharge, in order to become a black oxyd, this being the only degree of oxydation in which it can unite with the sulphuric base to form sulphur.

The precipitate, when washed and dried, is black, lightly tinged with green. It might be admitted into pharmacy, under the denomination of *æthiops antimonial, in the humid way.* The physicians of these departments who have prescribed it, have assured the author, that its exhibition has been attended with the best effects. [*Annales de Chimie*, No. 89.

The same author has, in a letter to Kasteleyn, on the *non-oxygenability of the sulphuric acid*, added the following facts, in addition to those stated by Vauquelin and Bouvier.

1. Twenty grains of the filings of zinc, dissolved in four ounces of sulphuric acid, were distilled over the oxyd of manganese, and sufficiently diluted. During the solution hydrogenous gas was disengaged. If the acid had been oxygenated, it would have imparted to the zinc its oxygen, some of which it required to dissolve it, and the water would not have been decompосed.

2. The same experiment, made with iron instead of zinc, afforded a similar result.

3. Thirty grains of zinc, dissolved in three ounces of sulphuric acid, were digested over the oxyd of manganese, according to the instructions of Giobert. The solution, in this instance, took place without any disengagement of hydrogen gas; but the metal dispelled the oxygen from the oxyd of the dissolved manganese, and not from the supposed oxygenated acid; it being proved by the disappearance of the red rose colour, that the sulphuric acid owed its combination with a portion of the oxyd of manganese, to the maximum of oxydation.

4. The same experiment, made with iron, produced a similar effect.

5. The nitric acid, boiled with the sulphuric acid, did not oxygenate the latter.

From these experiments, Van Mons has discovered how to prepare a liquor for artificial bleaching, which is remarkably cheap, and easily procured. Three parts of muriatic acid must be digested over one part of the oxyd of manganese, in a glass retort closely stopped; after a sufficient digestion, the limpid part is poured off, and precipitated with potass or soda,

in order to separate that portion of the oxyd of manganese which is dissolved; the ley is then filtered, and the precipitated oxyd is added to that which is not dissolved, to wash and make them re-oxyde in the open air, by the medium of water. In this manner the same oxyd may continually serve for new operations, and contribute much to the cheapness of the process.

This oxygenated liquid always retains a purple colour, if it be not surcharged with alkali; and it greatly resembles faggot-ley *(lessive de javelle)*. [*Ibid.*

M. Hildebrandt has lately made some useful experiments *on the solution of mercury in the nitric acid*, of which the following is an abstract.

One hundred parts of concentrated nitric acid dissolved one hundred and twenty-five parts of mercury. The same acid, diluted with half its quantity of water, dissolved one hundred and ninety-seven parts of the metal; but, when diluted with equal parts of water, it did not dissolve more than one hundred and seventy; and, if mixed with double its quantity of water, its solvent power was reduced to one hundred and fifty parts.

The crystalline form of the nitrat of mercury varies according to the circumstances in which the solution is made, whether in a low or high temperature, or if the acid is in a concentrated or weak state.

The nitrat of mercury uniformly deposits a portion of the white oxyd of that metal by its solution in water.

The nitrous solution of mercury forms crystals the moment it parts with its free or unsaturated acid.

The mercurial oxyds dissolve in a smaller quantity of the nitric acid than mercury in the metallic state.

The mercury is precipitated from its nitrous solution by the alkalies and caustic earths, in colours which differ according to the manner in which the solution has been made, or according to the state of oxydation in which it was dissolved.

Mercury and its different combinations offer a vast field to the inquiries and reflections of the chemist. M. Hildebrandt has discovered, by his experimental operations on this metal, at least *three hundred new facts*, and yet remarks that he has scarcely begun its investigation. [*Ibid.*

Van Mons has accidentally discovered a method of producing *a real white oxyd of mercury*, by precipitating the oxygenated muriat of mercury, formed by the mixture of the red oxyd of mercury, dissolved in the nitric acid by heat, with a solution of the muriat of soda. The precipitates which were formed by the first additions of alkali, disappeared almost as soon as they were separated; yet they were every time produced in great abundance. When the whole of the acid was saturated with ammonia, the precipitate became fixed; and its colour was of the finest white, and extremely light.

Neither the caustic, fixed, and volatile alkalies, nor lime, affected the colour of this precipitate; which only volatilized to a red colour, while it was reduced; it readily dissolved in the nitric and muriatic acids, &c. In short, it appeared to be a real oxyd of mercury, from the relation in which it stands to the alkalies and lime. [*Ibid.*

MEDICAL REPOSITORY.

VOL. III.—No. IV.

ARTICLE I.

A SKETCH OF THE MINERALOGICAL HISTORY OF THE STATE OF NEW-YORK.

By SAMUEL L. MITCHILL.

[Report to the Agricultural Society, continued from vol. i. p. 452, of *first edition*, and concluded.]

DESCRIPTION OF THE ISLANDS.

1. *Of the Primeval.*

(A.) MANHATTAN, or the iſland compoſing the baſis of the City and County of New-York, extends ſouth-weſtwardly, from King's-Bridge, about ſixteen miles, and is ſeparated from the continent by a ſtrait or channel, called Haerlem-River. This channel conſiſts of ſalt water, and riſes and falls with the tide. The iſland is exceedingly rocky. On its ſouth ſide, almoſt from the mouth of Haerlem-Creek to Bellevue, a diſtance of nearly three miles, the ſhore is compoſed, in many places, of high and large maſſes of ſolid rock; and the ſame kind of material underlays, at different depths, the ſtratum of ſoil. In many places the naked rock riſes above the ſurface of the land, in firm and continuous maſſes.

The general courſe of the rocks is from N. E. to S. W. and their ſtrata have generally not very much declination from the perpendicular. Both in the direction of the large bodies of them, and in the angle which the ſtrata form with the horizon, there is a moſt exact reſemblance with the granitical tracts on the continent already deſcribed.

There is ſo near a ſimilitude alſo in the natural characters and chemical qualities of the rock, with thoſe which have

been enumerated before, that a particular account of the various combinations of quartz, feldſpath, glimmer, ſhoerl, and garnet, would be but a repetition of what has been given in detail, in the preceding part of this report. It may be remarked, however, that the garnets which are found in the rocks of ſome part of Manhattan, are larger than thoſe the Commiſſioner ſaw in any other place, and more regularly cryſtallized. He ſaw alſo ſome exquiſite ſpecimens of ſtellated aſbeſtos; but the largeſt rock of this kind, which was of a roundiſh ſhape, and about ſix feet in diameter, has been buried in the earth, in the progreſs of improvement, between Corlaer's-hook and the city. The rocky foundation of the S. W. extremity of the iſland, beneath where the battery now is, has enabled this expoſed point to reſiſt, ſo remarkably as it has done, the further encroachment of the water, impelled by winds and tides. Thoſe extenſive beds of granite have been covered up, and are now hidden from view by the works of art, which have been erected on and around them.

(B.) Blackwell's Iſland. This is a ſpit or gore of granitical rock, of about one mile long, covered with a good proportion of arable ſoil, lying from E. N. E. to W. S. W. in nearly the narroweſt part of the Sound, between Manhattan and Long Iſlands. The violent and rapid current which runs on both ſides of this iſland, during the ebb and flow of the tide, has waſhed away almoſt every thing oppoſed to it, ſo as to leave, in many places, the mere rock behind. At the eaſt end there is a detached rock of conſiderable ſize, from which the land has been, to a conſiderable diſtance, carried away. And, in like manner, at the weſt end, rocks, emerging above the ſurface, from place to place, ſhew the direction of the granitical ſtrata; and, at the ſame time, give an idea of the alterations heretofore wrought by water, in carrying away the intervening portions of earth. The *Canoe-Rock*, a rock called the *Governor's Table*, and a number of other large rocks, ſtretching along far to the S. W. in deep water, are the remains of what was once, perhaps, continuous land.

(C.) The Mill-Rock. A little pictureſque iſland, of a few ſquare rods in extent, abounding in cedars and prickly pears, near the mouth of Haerlem-Creek, is ſo called becauſe it once ſupported a mill, which, it was the projector's intention, ſhould be turned by the force of the tide-water running beſide it. This is chiefly a compact maſs of granite.

(D.) Great Barn-Iſland, or *Parſell's Iſland.* This alſo lies near the mouth of Haerlem-River, and contains land

enough for two ſmall farms. One ſide of it is very rocky, but the other parts are good arable land. Theſe rocks are compoſed of materials ſimilar to the others.

(E. F.) The Brothers. Two ſmall iſlands, lying on the ſouth ſide of the ſhip-channel, near the mouth of Fluſhing-Bay, have hitherto reſiſted the impetuoſity of waves and currents, by reaſon of their rocky ſtructure. Both theſe, and the detached rocks and reefs around them, differ in no material reſpect from the character of the reſt.

(G.) Ryker's Iſland. A little to the eaſtward is an iſland, with banks of conſiderable height on the north ſide, which is by no means ſo rocky as the two laſt mentioned. There is, however, a conſpicuous maſs of granite upon it, and ſeveral ſmaller rocks, ſcattered about. From the looſe and gravelly material of which it conſiſts, its ſides are gradually crumbling down, and waſhing away, notwithſtanding the ſhore is thickly ſpread with rocks and ſtones—the remains of former waſhings, and encroachments of the ſurrounding water.

(H.) Miniford's, or City-Iſland. A ſmall iſland of nearly the ſame conſtruction and qualities as the preceding. A whimſical project was once formed of building a city on it.

(I.) Hart-Iſland. This lies a little to the eaſtward of the laſt-mentioned, and has no memorable difference that a mineralogiſt can diſcern. So named from having been uſed as a park, in former days, for deer.

(K.) Pea-Iſland. A maſs of granite of more than an acre in extent, with ſolitary rocks here and there in its neighbourhood. So called from affording the ſea-pea (piſum maritimum).

(L.) Hurtle-Berry-Iſland. This comprehends ſeveral acres, covered with trees and ſhrubs of various kinds, among which are abundance of hurtle-berry buſhes. Its baſe is of granitical rock, waſhed bare, in ſome places, for ſeveral rods, between high and low water marks. The opportunity of examining its materials, and their compoſition, is excellent. On this account, and becauſe of its curious configuration, this ſpot, though uninhabited, is more worthy of being viſited by the mineralogiſt than any other iſland in the Sound. The various compoſition of the rocks, together with the veins and fiſſures, and the materials with which they are filled, their width, and their turnings and windings, can be viewed here with uncommon advantage. But, on the north ſide, the granitical appearance is ſingularly modified in

one place. It becomes a grey or ſpeckled compoſition, chiefly of quartz and ſhoerl, and is broken, by natural diviſions, into ſomewhat of regular cylindrical maſſes, with flat ſurfaces at each end, like plain joints of baſaltes. There are upward of thirty of them, and ſome are piled in ſeveral tiers, lengthwiſe, upon each other. They form the outermoſt ſide of a ledge; and, by degrees, the quality of the rock alters ſo conſiderably, that, in the ſpace of a few feet, it no longer exhibits the columnar ſhape, but is entirely ſolid. Though the Commiſſioner has viſited this remarkable place more than once, he has unfortunately loſt the memorandum of the exact dimenſions of the joints or columns of this baſalt-like rock. From the beſt of his judgment, on recollection, he thinks they are from two and one half to three feet, or more, in length; and, being without regular angles, are from fifteen to twenty inches in diameter. Several of the iſlands in Suffolk County, near the eaſt end of Long-Iſland, have been omitted in this ſurvey. There are ſeveral ſmall iſlands, and very numerous rocks, lying along the New-York coaſt in Weſtcheſter County, which contain nothing new or memorable for deſcription.

(M.) Long, or Naſſau Iſland. This piece of land, which forms the eaſt and ſouth ſides of the bay and harbour of New-York, extends north-caſtwardly about 120 miles, and terminates in a fork; the ſhorter extremity of which is called *Oyſter-Pond*, and the longer, *Montauk-Point*. The land is very low, eſpecially on the ſouth ſide, and, of courſe, not viſible from any great diſtance at ſea. The higheſt land on the iſland is called *Harbour-Hill*. Its average breadth is eſtimated at about eight or nine miles. A ridge of hills runs almoſt the whole length of it on the north ſide, and completely divides its waters. The ſtreams have, on this account, much ſhorter courſes toward the Sound than on the ſide next the ocean, and are, conſequently, more rapid and precipitous.

The face of the country, on the one ſide of this elevation, which may be called the *Spine of the Iſland*, is exceedingly different from that on the other. On the north ſide it is variegated, uneven, and very much diverſified with hills and dales; while, on the ſouth, little elſe is diſcovered by the traveller than a flat ſurface, ſloping very gradually away toward the ocean. Stones and rocks are very frequent on the ſide next the continent; but, on the atlantic ſide of the hills, a carriage may be driven many miles without the leaſt impediment from them. Indeed, the tract which lies northward of the

ridge, not only reſembles the adjoining parts of the main land in its face and general appearance, but alſo in its foſſils and mineral productions. It appears to have been ſeparated from the continent, during the lapſe of ages, by the encroachments of the ſalt water.

From a ſurvey of the foſſils in theſe parts of the American coaſt, one becomes convinced that the principal ſhare of them is granitical, *compoſed of the ſame ſorts of materials as the higheſt Alps, Pyrennees, Cáucaſus and Andes, and, like them, deſtitute of metals and petrifactions.*

The occurrence of *no* horizontal ſtrata, and the frequency of vertical layers, led him further to ſuppoſe, *that theſe ſtrata are not ſecondary collections of minerals, but are certainly in a ſtate of primeval arrangement.*

The *ſteatites, amianthus, ſhoerl, feldſpath, mica, garnet, jaſper, ſhiſtus, aſbeſtos* and *quartz*, muſt all be conſidered as *primitive foſſils, and by no means of an alluvial nature.*

What inference remains now to be drawn from this ſtatement of facts, but that the faſhionable opinion of conſidering theſe maritime parts of our country as flats, hove up from the deeps by the ſea, or brought down from the heights by the rivers, ſtands unſupported by reaſon and contradicted by experience?

A more probable opinion is, that Long-Iſland, and the adjacent continent, were, in former days, contiguous, or only ſeparated by a ſmall river, and that the ſtrait which now divides them was formed by ſucceſſive inroads of the ſea, from the eaſtward and weſtward, in the courſe of ages. This conjecture is ſupported by the facts which follow; *to wit.* 1. The foſſil bodies on both ſhores have a near reſemblance. 2. The rocks and iſlands lying between are formed of ſimilar materials. 3. In ſeveral places, particularly at White-Stone and Hell-Gate, the diſtance from land to land is very ſmall. 4. Wherever the ſhore is not compoſed of ſolid rock, there the water continues to make great encroachments, and to cauſe the high banks to tumble down, as is true, not only at Plandome, but at Montauk, Newtown, and elſewhere, at this very day. 5. The rocky piles in the Sound, ſoon to be deſcribed, called Executions and Stepping Stones, and Hurtle-Berry-Iſland, Pea-Iſland, Hart-Iſland, already named, and many more that lie up and down, are ſtrong circumſtances in favour of this opinion: for, from ſeveral of them, all the earthy matter, as far as the higheſt tides can reach, has long ſince been carried away; and, from the reſt, the ſand and gravel continue to be removed

by daily attrition; as is true alſo of the Brothers, Ryker's, Blackwell's, and other iſlands. 6. There is a tradition among that race of men who, previous to the Europeans, poſſeſſed this tract of country, that, at ſome diſtant period, in former times, their anceſtors could ſtep from rock to rock, and croſs this arm of the ſea on foot at Hell-Gate.

On this ſide of the iſland there are ſome ſolitary rocks, or enormous heaps of granite, which are too remarkable to be omitted in this deſcription.

To the eaſtward of the ſtrait called Hell-Gate, all the conſiderable rocks are ſolitary maſſes of granite. Theſe are ſcattered over the upland, and along the ſhores between high and low water marks, and under the ſalt water of the bays and of the Sound. In the latter caſes they are much frequented by fiſhes, and many kinds of theſe animals are caught around them by the hook and line. Some of theſe detached or inſulated rocks are of conſiderable ſize. In the town of North-Hempſtead, not more than a mile and a half from the Commiſſioner's country-houſe, is the largeſt rock of the kind that he has ſeen. It is of a remarkable figure, forming a ſort of irregular ſquare, of the extent of about forty feet on the weſt, ſouth, and eaſt ſides, and of nearly twenty on the north. It lies on the declivity of a hill, and its thickneſs above ground increaſes from ten or twelve feet, as you deſcend, to ſeventeen, or thereabout. The top of the rock, to which he aſcended by a ſhort ladder, is, to a conſiderable extent, pretty nearly level, and ſupports earth enough for a number of plants to grow. Among others he noted a peach-tree, a yerva-mora (bozea), a ſpecies of cactus, a thorn-buſh, an oak and a lilach, beſides ſeveral other perennials and graſſes. It is known, in the records of the town, by the name of the *Mill-Stone Rock.*

Suppoſing the rock to be uniformly thick, which is by no means an improbable ſuppoſition, then forty, the length, multiplied by thirty, the average breadth, gives a ſuperficies of twelve hundred ſquare feet. This number, multiplied by ſeventeen, the ſuppoſed thickneſs, gives *twenty thouſand and four hundred cubic feet*—A vaſt, lump, indeed, of ſolid granite! and lying remote from all mountains and ſtrata, for a diſtance of eight or nine miles at the leaſt.

He has conſidered this rock as a maſs of compact granite; not, indeed, that it has no cracks or fiſſures in it, but becauſe all the pieces of which it is compoſed, and they are not numerous, are well fitted to each other, and ſhew, by their

ſhape and adaptation, that, as they are now *in ſitu*, they were once united into a whole.

There are, in the ſame town, other huge rocks of ſolitary granite, though not ſo regular and large as the one juſt deſcribed. And the well-known ſhoal of *Old Succeſs*, in the Sound, near the mouth of Cow-Bay, has, in its centre, a granite rock, whoſe top is ſometimes bare, when the water around it is fifteen or ſixteen feet deep.

The appearance of things on the ſouth ſide of the Spine, led the Commiſſioner to believe that the foot of thoſe hills was the ancient barrier of the ocean, and that the whole extent of level land between them and the ſea, is a dereliction of the waters. As the north part of Long-Iſland was evidently *primeval*, ſo the ſouth ſide afforded tokens no leſs convincing of its *ſecondary* nature. Its horizontal ſtrata, its ſandy and gravelly quality, and the roundiſh and water-worn ſurfaces of its quartzy pebbles, all lead to ſuch a perſuaſion. The land, beſides, is very bare of vegetable mould, as well as of rocks and ſtones, and the timber is generally of a much ſmaller growth. And, what is well worthy of note, the ſoil is ſo peculiar, that various ſpecies of vegetables grow on it, which are not ſeen on the other ſide of the Spine. This is ſo much the caſe, that the two ſides of the iſland make a ſtrong contraſt. On this ſide alſo, ſhells of marine animals are more frequently met with in digging wells, though it is ſaid that, toward the weſt end of the iſland, the remains of teſtaceous creatures have been found at conſiderable depths, in ſome places, on the north ſide of the ridge.

Between Long-Iſland and the continent there are ſeveral ſhoals, with rocks ſcattered over them, which are, apparently, *ſunken* or waſted iſlands. Theſe remains of what was, probably, in former days, upland of as great height as the neighbouring iſlands, afford ſtrong evidence of the levelling power of the waves. One of theſe ſhallow places, whoſe rocks are frequently bare at low water, lies off the extremity of Cow-Neck, and occupies ſeveral acres near almoſt the middle of the Sound. From the damage ſometimes done to veſſels, by this ſhoal and its rocks, they are called *Executions*. Another ſandy ſpot of many acres, with ſeveral large rocks appearing here and there above the little water which covers it, ſtretches far toward the main channel from the bottom of Great-Neck. Theſe rocks are called the *Stepping Stones*. Such of the iſlands enumerated as have not a rocky baſis,

will, probably, in the progreſs of things, be waſhed down, and undergo a ſimilar ſubmerſion.

Some facts remain to be mentioned, which will tend toward an explanation of the rapid currents and dangerous navigation of *Hell-Gate*. This is a ſtrait, one of whoſe ſides is formed by *Long-Iſland*, and the other by *Parſell's* and *Manhattan*. Between the two latter, Haerlem-Creek empties itſelf into Hell-Gate. It has been mentioned already, that the great maſſes of rocky matter run from N. E. to S. W. There is ſo great a quantity of ſolid granite hereabout, that both the ſhores, and the intervening rocks and reefs, almoſt altogether conſiſt of it. Such a compact body of it impedes, on the Long-Iſland ſide, the direct flow of the water of the Sound, in a north-eaſtwardly and ſouth-weſtwardly direction, ſo completely, that the current is forced to take a ſhort and ſudden turn round the point of Parſell's Iſland. The change of direction which the water is obliged to take is north-weſtwardly, or nearly at a right angle with the ridges and ſtrata of rocks which formerly connected the two iſlands. And ſuch has been its impetuous and irreſiſtible force, that the dams of ſolid rock, which nature had conſtructed acroſs, have been broken down and carried away, and nothing but their ruins are now to be ſeen. The broken remains of theſe ſtrata of granite are viſible, as they extend N. E. from Long-Iſland, and S. W. from Parſell's Iſland, partly above, and partly under water. Where the ſtrength of the current has thrown the fragments of the ſtrata irregularly and confuſedly about, the foaming and agitation they occaſion in the water, as it runs among and over them, has given riſe to the whimſical names of the *Pot*, the *Frying-Pan*, and the *Grid-Iron*, which the boatmen apply to theſe rude and diſordered piles of ſunken rocks. Where the force of the water has not been ſufficient to break down a whole ſtratum, but a part thereof ſtill braves its power, a judgment may be formed, from the parts which are left, what the original conſtitution was. The *Hog's-Back*, *Hallet's Point-Reef*, the *Mill-Rock*, the *Middle-Reef*, and the *South-Rock*, are plain and inſtructive monuments of the ancient arrangement. They are portions of ſtrata remaining, after all the reſt had been ſwept away by the tides. After having thus forced its way through and acroſs theſe mounds of granite for about one quarter of a mile, the current turns, and purſues its former courſe, not any longer acroſs the ſtrata, but in a direction nearly parallel with them.

(N.) Staten-Iſland. Evidently a parcel of land, of much the ſame quality with the north ſide of Long-Iſland, left between the currents of the *Narrows*, ſeparating it from Long-Iſland, on the one ſide, and the *Kills*, dividing it from New-Jerſey, on the other.

(O. P. Q.) Governor's, *Bedlow's*, and *Ellis's Iſlands*, are three ſmall bodies of earth and ſand left in the Bay of New-York, not memorable for any thing mineralogical.

(R.) Salſbury-Iſland. A maſs of granite, ſituated near the *Horſe-Race*, between the Donderberg and Fort-Montgomery, on the weſt ſide of Hudſon's River, a little north of the entrance of the Highlands.

(S.) Guanos-Hook-Iſland. Another pile of granite, on the weſt ſide of the river, almoſt oppoſite the Sugar-Loaf-Mountain in the Highlands.

(T.) Conſtitution-Iſland. A ſolid collection of granite, lying eaſt of the fortreſs of Weſt-Point, in the Highlands.

(U.) Pollepel's Iſland. This is little more than a huge maſs of granite, lying on the eaſt ſide of the channel of Hudſon's River, between the village of New-Cornwall and the town of Fiſh-Kill. The reader will recollect that this one is of the northernmoſt places where granite is found, as was mentioned on a former occaſion.

(V.) Eſopus-Iſland lies in Hudſon's River, a few leagues above the village of Poughkeepſie. It conſiſts chiefly of ſhiſtus, and quarries of ſlate have been worked on it. Of the ſame material conſiſt many ſmall iſlands not far below the village of Tivoli.

(W.) Coeyman's Iſland. A maſs of ſhiſtic rock, which lies on the weſt ſide of the channel in Hudſon's River, juſt below the village of Coeyman's. When viſited by the Commiſſioner, there were many traces of perſons having been engaged in digging for money, according to a notion, prevalent along an extenſive portion of the American coaſt, of treaſure having been formerly hidden by the pirates. In the courſe of his reſearches, the Commiſſioner, in ſeveral other places, has found large holes in the earth, and ſome of them very recent, formed by the fooliſh and credulous money-diggers.

2. *Of the Secondary.*

The principal of theſe iſlands, beſides the ſouth ſide of Long-Iſland already mentioned, are the *beaches* and *marſhes* which lie between it and the Atlantic Ocean, and the *low*

iſlands frequent in Hudſon's River, between the mouth of the Katt's-Kill and that of the Mohawk-River.

(A.) The Marſhes. On the ſhallows and flats of the bays, where there is but little current, but merely the ſwell and receſs of the tides, certain plants delight to grow, particularly *ſedge*, and, with their roots, form a thick matting at the bottom. The mud and ſand, which had before been moveable, now become more fixed and adheſive. The decaying roots and leaves of the plants are detained on the ſpot, and become a layer of vegetable matter for the ſeeds to ſprout and take root in. Theſe growing to maturity, and dying in their turn, make a new ſtratum for a freſh crop; and theſe, again, furniſh an additional quantity of ſoil for another growth. To theſe are added whatever of floating or feculent matter the water may drift or drop upon the marſh: and this proceſs goes on until the new iſland riſes ſo much above the level of common high tide, that the roots of the ſedge can attract no more nouriſhment from the ſalt water:—it then ſtops. The higheſt, therefore, of theſe marſhy tracts, is not much greater than the difference between high and low water marks, or ſeven feet and a half. (The Commiſſioner, indeed, never ſaw any ſo high). They are very numerous, and ſome of them of large extent. They are ſcattered along almoſt the whole length of the iſland. The wholeſome and nutritious quality of the ſedge they yield, makes it of great value and eager demand to the farmers, who carry, annually, thouſands of loads of it, in waggons, quite to the north ſide of Long-Iſland, in ſome places a diſtance of fifteen, or even twenty miles, to feed their neat cattle upon during the winter.

(B.) The Beaches. By the force of waters draining from the land, on one part, and by the impulſe of the ocean on the other, not only are *bars* and *flats* formed below, but ſometimes the land and gravel are impelled between them with ſo much violence and fury, that they riſe to a conſiderable height above the level of the ſpring-tides. The iſlands, hove up in this manner, are commonly long and narrow, with a break or inlet, from place to place, through them. They conſiſt almoſt entirely of the ſand of quartz, worn very fine by the attrition of the waves, and rounded pebbles of the ſame material. To theſe are added the ſhells of various marine animals. The ſand of theſe beaches has been carried a great diſtance, for the manufacture of glaſs. The beaches ſtretch along about as far as the marſhes; it being generally obſervable, that wherever the former checks the ſurges of the ſea,

the latter ſpring up in the calm and even water behind them. *Hog-Iſland* and *Coney-Iſland* belong to the beaches.

(C.) The Overſlaghs and low Iſlands. The water of the Hudſon becomes more difficult to be navigated, as you aſcend from Katt's-Kill towards its ſource. A large tract of the country, adjoining that part of the river, is of the *alluvial* kind before deſcribed. And the deſcending rills, freſhets and ſhowers, bring down the ſand and gravel, from the hills and plains above, faſter than the current of the river can deliver them to the ocean. Hence large bodies of theſe *ſecondary* materials collect where the ſtream has too little force to carry them away, and form ſhoals, or, as they are called, *overſlaghs*, beneath the water, and low, level, and ſandy iſlands a little above it.

The principal flats or overflaghs are, 1. *Coeyman's*, a little above a landing called Baltimore. 2. *Winne's Bar*, juſt above Caſtleton: and, 3. The *Great Overſlagh*, about three miles below the City of Albany.

The iſlands adjoining the *overſlaghs* are evidently *ſecondary*. They conſiſt of ſand, gravel, loam, and other *alluvial* materials. Their ſtrata are horizontal. They are ſo little above the level of the river, that the floods of the ſpring, cauſed by the melting ſnow in the upper country, lay them under water: and they ſometimes enlarge, and then again diminiſh, according as the current of the river accumulates new materials around them, or forces the old away. Their number is between twenty and thirty, as he believes, and many of them are not publicly diſtinguiſhed by appropriate names. None of them are the permanent reſidence of men, though ſeveral are valuable appendages to the neighbouring farms.

Albany, October 20, 1796.

Note to be referred to the Deſcription of the Whin-Rocks, *on the weſt ſide of the North-River, after line* 24 *of p.* 301, *vol.* i. *firſt edition.*

On a viſit to that ridge of rocks, ſince the publication of the former part of this Report, the Commiſſioner has ſeen a figured maſs of it, having five ſides and five angles. This pillar of baſaltes lies on the margin of the water, in the place to which it tumbled when it was detached from its connection with the main body of whin above. He is ſatisfied now of the reſemblance of this cliff to ſome of the precipices in the King's-Park, near Edinburgh, and to the rocks on the eaſt ſide of the caſtle of Dunbarton, in Scotland.

Errata.

In the former part of this Report, concerning the ſtreams whoſe falls in the Blue Mountains were deſcribed, inſtead of "Kaat's-Kill" read *Kader's-Kill.*

In p. 448, 14th line from the bottom, for "animal" read *annual.*

ARTICLE II.

A SKETCH *of the* HISTORY *of the* DISEASES *of the* STATE *of* DELAWARE: *Communicated in a Letter from Dr.* JOHN VAUGHAN, *of Wilmington, to Dr.* MILLER.

No. II.

Dear Sir,

HAVING concluded my firſt number with intermitting fevers, and the month of September, I now proceed to October, and the article of remittent fever. Why remittent fevers are more frequent in the latter part of the ſeaſon, is a queſtion which I refer to older heads to determine. For unleſs it be imputed to a concentration of miaſmata, or higher degree of the cauſe of intermittent fevers, I muſt confeſs myſelf ignorant of its nature. If the ſame effluvia may produce dyſentery and intermittent fevers, they may produce remittent fevers, when modified by maturity, and, alſo, remittents of various degrees of violence, as, I doubt not, will be manifeſted in the ſequel.

Our remittents bear but a ſmall proportion in the general ſcale of fevers; perhaps not more than *one* to *thirty* of intermittents. Nature, though diverſified in her gifts, is ſtill republican in preſerving a degree of general equality. The concomitant evils are moſtly parallel. Though we are annually harraſſed with *agues*, we are not much troubled with her more formidable relations. The fall of 1798, however, forms an exception: and, preſuming that a hiſtory of the diſeaſe of that ſeaſon will anſwer the preſent purpoſe, without a minute detail of our common form of this diſeaſe, as it is only different in degree, I ſhall confine this eſſay principally to that ſubject.

The firſt caſe of remittent fever that occurred was in July. The diſeaſe aſſumed no regular or diſtinct type: the remiſſions were obſcure and the debility great. When I firſt ſaw the patient, which was on the eighth day, the tongue was parched and dark-coloured, blood oozed from the noſe, and the ſurface of the body was variegated by purple blotches. By the liberal uſe of wine, and other tonics, this patient recovered.

The ſecond caſe occurred in October, in a boy aged ſix years. I was called on the eighth day, and found him iraſci-

ble, without fever—tongue black—pulſe feeble—ſurface yellow—a laborious breathing, with frequent ſighing—a perpetual vomiting of granulated black matter, and blood oozing from the lips and gums. In this caſe little was attempted, and ſtill leſs effected. He died comatoſe in a few hours.

About ten days preceding the attack of this child, a woman had died in the ſame houſe, and, the family ſaid, with ſimilar ſymptoms. This circumſtance made me ſuſpicious of contagion: but the parents affirmed that neither of them had been expoſed to diſeaſe. They lived in a ſequeſtered place, adjacent to an extenſive marſh; and the occurrence of numerous other caſes, in different parts of the neighbourhood, ſoon convinced me that it was an indigenous diſeaſe.

General Characters of the Diſeaſe.

It ſometimes attacked ſuddenly with rigor, but frequently was preceded by languor and nauſea of two or three days duration. The violence of the caſe was announced by the manner of attack. If the attack was ſudden, the caſe was deſperate, and *vice verſa.*

The fever was ſometimes obſcure—generally a remiſſion morning and evening; and it partook, in ſome meaſure, of the tertian type.

The pulſe was generally full and quick, not always tenſe, and blood drawn ſhewed little inflammatory buff, unleſs there were local affections.

The head was generally affected with pain, particularly in the forehead, and the eyes with inflammation and jaundice. An icteritious colour of the ſkin ſoon ſucceeded that of the eyes.

The bowels were generally coſtive in the commencement—ſtomach irritable—vomiting often intervened on the third or fourth day. The criſis uſually happened on the fifth, ſeventh, or eleventh day. If protracted beyond the fifth, the breathing became oppreſſive, with cardialgia, great anxiety of the precordia, and frequent ſighing. If it paſſed the ſeventh, it frequently reached on towards a putrid fever, ſo called; the teeth became incruſted with a black matter—a vomiting of chocolate-coloured matter came on—the tongue became parched and fiſſured—blood oozed from the lips and gums—the heat retreated from the extremities, and coma and death ſoon cloſed the tragic ſcene. But if it lingered on to the eleventh day, without theſe urgent ſymptoms, it became an ordinary typhus fever.

Method of Cure.

From the affinity which this diſeaſe evinced to the yellow fever, I had recourſe to the ſame mode of treatment. In all caſes where the febrile heat was conſiderable, pulſe full, and head or breaſt much affected, I employed the lancet *pro re nata*, began the uſe of mercury in various forms, and produced a ſalivation as ſoon as poſſible. If the pulſe was reduced, without a relief of the local affections, bliſters always relieved them; but as ſoon as the gums were touched with the mercury, the conqueſt was complete, and nothing left to be done, but to adopt a reſtorative regimen.

I cautiouſly avoided purgatives, for two reaſons: 1. They would hurry off the calomel through the bowels, and prevent its affecting the glandular ſyſtem: and, 2. I have always found briſk purgatives increaſe the counter-determination to the bowels, in our autumnal fevers; and, in two caſes, produce ſudden death. I remonſtrated againſt their uſe, but without effect. Spontaneous diarrhœas are alſo generally obſtinate, and frequently fatal. I therefore ſubſtituted active injections.

In two caſes of black vomit, I found brandy grog the beſt anti-emetic.

The warm bath was a powerful auxiliary. It promotes perſpiration, obviates a congeſtion of the biliary ducts, facilitates the operation of mercury, and diffuſes the excitement over the ſyſtem. The moſt convenient mode of applying it, in advanced caſes, is by wrapping the patient in a blanket wrung out of warm water. By this means we avoid the fatigue of immerſion, which is often an important conſideration in the laſt ſtage of fevers.

The prohibition of purgatives in this diſeaſe will, no doubt, be criticiſed by ſome of the faculty. I, however, wiſh them equal ſucceſs in the uſe of them. I did not loſe a ſingle patient to whom I was called in the beginning, but witneſſed the death of ſeveral who were treated with antimonials and purgatives.

The intermittents of this fall were alſo unuſually obſtinate, and varied in their form; frequently alternating double tertians, appearing like two diſeaſes running different courſes, and worſe and better every other day. The intermiſſions were of ſhort duration, and they not unfrequently degenerated into typhus fevers.

It is a ſingular fact, that all our febrile diſeaſes partake of

the tertian type. They are alſo of the ſynochoid genus. Some of your able correſpondents may ſolve thoſe problems: I am content with relating facts.

Yours in ſincerity,

JOHN VAUGHAN.

Wilmington, January 31, 1800.

P. S. The cynanche trachealis has been very general here this winter, in children; moſtly confined to infants on the breaſt. The old Sampſon *calomel*, was my general and ſucceſsful remedy, given ſo as to preſerve a laxative ſtate of the bowels. The ſeneka was alſo given as an auxiliary; but the ſyrup of ſquills, exhibited in ſuch quantities as to produce permanent naufea, and occaſional ejection, was preferable. Bliſters were applied, though to little purpoſe. Cataplaſms of *onions* were equally, if not more ſerviceable.

A few years ſince I diſſected a child that died of this diſeaſe, and found a firm ſemidiaphanous membrane attached to the baſe of the epiglottis, of an inch and a half in length, forming a valve in expiration.

For the purpoſe of determining whether this membrane was the product of increaſed ſecretion, or inflammatory action, I ſubmitted it to a variety of experiments, of which the following are the reſults.

1. That the membrane formed by the cynanche trachealis is ſoluble in ſulphuric acid, and cauſtic alkaline ley.

2. That it is not ſoluble in water, as is obſerved by Dr. Home.

3. Alſo, that coagulable lymph is ſoluble in the ſulphuric acid, and cauſtic alkaline ley.

4. That, on the addition of water to the ſolution of the membraneous matter, or lymph, a partial precipitation is produced; and the addition of alkali to the acid menſtruum produced a complete precipitation, and *vice verſa*.

Laſtly. From comparing theſe reſults with the experiments of the late Mr. Charles Darwin on mucaginous matter, I think we may juſtly infer, that the membrane is not mucaginous; and, *e converſo*, that it is formed of coagulable lymph, exuded from the tracheal veſſels, and ſimilar to thoſe exudations found on inflamed viſcera. The more fluid particles exuded paſs off in expiration, leaving the lymph firm, glutinous and membranous.

Mr. Darwin, however, tells us, that coagulable lymph is not ſoluble in the vitriolic acid. On this account I procured

the blood of different perſons, and treated it both by *affuſion* and *trituration*, with the ſame reſult. We can ſcarcely ſuppoſe, that there is ſuch an important phyſical difference between Scottiſh and American blood; therefore one of us muſt be miſtaken. My experiments were ſubmitted to ſeveral medical gentlemen, who can atteſt the fact.

In addition to thoſe teſts of identity of the membrane and coagulable lymph, may be added the appearances of the internal ſurface of the trachea. The blood-veſſels were diſtended, as if injected, and the intermediate ſpaces were of a *bluiſh* colour. J. V.

ARTICLE III.

MASONIC RELICS *of Dr.* BROWN, *preſerved by Dr.* LAWRENCE, *of* NEWTOWN. *From the original Manuſcript in the Poſſeſſion of Dr.* MITCHILL. *Elucidating what is ſaid of his Life and Character by Dr.* BEDDOES, *p.* 85 *and* 89.

THE paper contains the order of buſineſs, and the toaſts given one evening in his Latin Lodge of the *Roman Eagle*.

Vota. (Toaſts).

1. Floreat Aquila Romana.
2. Regi et Arti. (The craft).
3. Magno apud Scotos magiſtro, et circulis (lodges) ei parentibus.
4. ——— Americanos, &c.
5. ——— Anglos, &c.
6. ——— Hibernos, &c.
7. Munera in magno noſtro circulo (grand lodge) gerentibus.
8. Probis viris et pulchris puellis.
9. Mortalium ærumnæ pellantur.
10. Venus, Ceres, et Bacchus, nunquam deſint probis Ædificatoribus (good Maſons).
11. Bonorum ædificatorum aratrum procedat.
12. Salus eum plenâ Crumenâ.
13. Verum gaudium merentibus.
14. Libertas liberis animis.

15. Foveamus ulnis quas cordi eſt amare.

16. Ædificatoribus et ædificatorum proli, et omnibus, quæ vel foventur vel foveri cupiunt ab ædificatoribus.

17. Provideatur quibus non proviſum eſt.

Sacerdos benedicat, debitâ omnium bonorum datori, veneratione.

This being done, and the maſter of the lodge (Brown himſelf) not being preſent, a glaſs was filled to his name, and drank with the enſuing ſentiment:

Cariſſimo, ſpectatiſſimo, ingenioſiſſimo Aquilæ Romanæ Magiſtro;—cujus ſub auſpiciis, bonis cum hominibus, Aquila pacem et cultum, non arma et cædem præ ſe ferens, mirantibus Britannis ſublata eſt, et ſub cujus curâ floret et florebit;—et cujus ingenio, ex arte conjecturali et parùm ſibi omnibus ſuis partibus conſtante, medicina ad veram ſcientiam redacta eſt;—quique ſolus medicinæ magiſter, ſuos amat et a ſuis amatur:—Omnia proſpera ſuccedant *magiſtræ noſtræ* (Mrs. Brown) et proli ejus.

After which the following note was read, intimating that he was not preſent on account of impriſonment, and apologizing to his diſciples, many of whom were members of his lodge, why he had failed to meet them, and give them lectures.

"Perſecutione pluſquam Dioclefianâ, cariſſimi diſcipuli! veſ-
"ter magiſter et preceptor ad carcerem compulſus ſum. Pen-
"dens a meis diſcipulis, opto et ſpero veſtrum præſidium; voſ-
"que non gravaturos, ſolitis horis elementorum medicinæ in-
"ventorem etiam in carcere viſere et præcepta medica accipere.
"Quo facto, omnia deinde mihi et vobis proſpere cedant; et ut
"par eſt, ſemper vos, ut cerebro meo natos (children of my
"brain) agnoſcam foveboque."

They went and heard him in jail!

ARTICLE IV.

OBSERVATIONS *on the* DISEASE *commonly called* YELLOW-WATER *in* HORSES: *In a Letter from the late Dr.* F. B. SAYRE *to Dr.* BARTON.

My good Sir,

A PAINFUL and long-protracted indiſpoſition has prevented my attending, as early as my wiſhes prompted, to a requeſt you ſome time ſince made; and, I fear, from the time already elapſed, you may be led to expect ſomething more conſiderable on this ſubject than my opportunities of information or obſervation will realize.

The ſummer of the year 1793 was the firſt in which the yellow-water was obſerved in that part of Jerſey where I then reſided. The diſtrict where the diſeaſe was moſt frequent as well as fatal, is one of the moſt highly cultivated countries in Jerſey. The ſurface of the ſoil is generally uneven, but there are no high hills. The arable land is a light loam, with rather an over proportion of ſand. The quantity of meadow is large, compared with the upland. The meadows are what are called bottom-lands, by which is meant ſwamps, which, by ditching, &c. have been rendered dry enough for the cultivation of graſs. The ſoil of theſe meadows is generally a very black vegetable mould of ſome feet in depth, reſting upon a ſtratum of blue clay; but many of the meadows have a pretty thick ſtratum of iron ore, which, when expoſed to the air, ſoon acquires a hardneſs ſufficient for the purpoſes of building, and is uſed for the foundations of houſes.—I do not remember to have heard of this diſeaſe being introduced by chills. Loſs of appetite, incapacity for labour, coſtiveneſs, heavineſs of the eyes, and great heat, were the uſual ſymptoms: the urine alſo was remarkably high coloured; a cough, more or leſs ſevere, frequently attended; and, in ſeveral which I ſaw, there was an evident enlargement of the belly and limbs. The blood, when drawn, and ſuffered to cool, was extremely buffy, exhibiting a covering of coagulable lymph, in many inſtances more than an inch thick. The diſeaſe was uniformly believed to be contagious; and, therefore, the farmers aſſiduouſly ſeparated the diſordered from the ſound. Many of thoſe, I obſerved, had large glandular ſwellings about

the throat, which ſuppurated; and ſuch, I think, were more apt to recover.—It was obſerved that thoſe horſes which were ſtabled uniformly fared worſt; on which account it was the practice to turn the ſick into fields appropriated to them alone, for fear of infection.

Bleeding, purging, and roweling, were the remedies in common uſe; but, I believe, the two former were ſeldom carried to the extent that was neceſſary, and the laſt was probably of little conſequence. The purge commonly made uſe of was crude antimony. One of my neighbours, who had loſt ſeveral horſes in the diſeaſe, having a pair of valuable carriage horſes ſeized with it, by my requeſt, gave them calomel very largely. They both recovered, though very ſlowly, and were unfit for ſervice ſeveral months. I know of but one diſſection of a ſubject that died of this diſeaſe, and that I did not ſee. It was performed in a very rude manner, by a farmer, whoſe property the horſe was. He informed me the contents of the abdomen had, in many places, grown together; that there were ſeveral pints of water in the belly; and that the liver was larger and blacker than uſual.

During the prevalence of this diſeaſe, I had a fine horſe attacked with what is called ſtaggers, but which I believed to be a variety of the yellow-water—the force of the diſeaſe being directed to the brain. A number of gentlemen who ſaw the animal pronounced him irrecoverable, and I therefore determined to hazard an experiment, the ſucceſs of which ſurprized and diſappointed every body. About eleven o'clock of the day on which I firſt diſcovered the illneſs, and after the horſe had been pronounced paſt all hope of recovery, I bled him in the jugular vein, and meaſured the blood as it flowed. The intention was to bleed *ad deliquium*. I drew a large tin cup, holding conſiderably more than a pint, thirteen times full, before the horſe fell. The laſt cupful I preſerved. It was extremely buffy. After lying about half an hour, the horſe got up, and ſeemed better than before the bleeding; but, towards evening, the ſtaggering and blindneſs returned: I, therefore, again opened the vein, and bled till fainting enſued, which happened when almoſt ſeven cupfuls had been diſcharged. The next morning he ſeemed conſiderably better, and I gave a drachm of calomel, with three drachms of jalap, which acted powerfully: but, about noon, the ſtaggering again came on, and I once more bled about the ſame quantity as at the ſecond bleeding. In the evening the horſe began to nibble a little graſs, for the firſt time ſince his ill-

neſs; and, the next day, appeared to have no diſeaſe. I kept him a few days, to ſee that the attack was not repeated, and then ſent him to paſture a few weeks. He was returned to me well, and, I believe, continues ſo to this day.

I am, with reſpect,
Yours, &c.
FRANCIS BOWES SAYRE.

ARTICLE V.

OBSERVATIONS *on the* YELLOW FEVER: *Communicated in a Letter from Dr.* FELIX PASCALIS *to Dr.* MITCHILL, *dated Philadelphia, Nov.* 11, 1799.

Sir,

WITH pleaſure I perceive that the public opinion, concerning the origin of the yellow fever, is very much changed; owing chiefly to the viſible influence of the ſtate of the weather on the late epidemic, which was, accordingly, often extinguiſhed, and often revived again. This phenomenon ſtruck me ſo much, that I ſeriouſly contemplated whether all the cauſes concurring to produce the exhalations could not be enumerated; ſo that, their reſpective *action* being known, and calculated upon given proportions, we might draw up tables for exhalations as we do for the common meteorological obſervations.

My attempt was not altogether unſucceſsful. It appeared obvious to me that four cauſes were neceſſary to the formation of deleterious or ſeptic gaſes, and for their floating in our atmoſphere. Theſe are independently of other chemical cauſes, in materials expoſed to putrid fermentation; and I reckon they are *heat*, *moiſture*, *winds*, and *decreaſe* of the days. Without entering now into any chemical arguments in proof of this aſſertion, while they are obvious enough to you, I ſhall only obſerve, that when gaſes are formed, and, once a day at leaſt, diſengaged, through ſufficient *heat*, they will become concentrated and deleterious in inverſe ratio of the decreaſe of the days; or, in other words, in proportion to all thoſe circumſtances of cool nights, morning and evening dews, abſence of light, fogs, &c. which are oppoſed either to the ſolution of theſe gaſes in the atmoſphere, or which fix them in the orbit where we breathe;

and, at laſt, which knead them, as it were, with the moiſture and aqueous vapours, which are daily increaſing.* Theſe firſt ideas ſeemed to be convincing enough; but ſtill more ſo, after having aſſigned certain gradations and ſeries to each of thoſe cauſes, in order that I could apply them to daily obſervations, which I carried on during the whole month of September. So far as the number of new caſes of the fever came every day to my knowledge, I found that they were pretty much in proportion to the aforeſaid cauſes which promote exhalations, and the prevalence of ſeptic gaſes in the atmoſphere. Yet, I muſt confeſs, that not much preciſion could be obtained, as no correct account of the new caſes was publiſhed. I am not yet ſatisfied of the beſt means for aſcertaining the gradations of moiſture which ſometimes reſults from the ground after rain, ſometimes from the winds. The reſults of the hygrometer cannot be applied to theſe obſervations, becauſe the formation of gaſes cannot be equally promoted by aſcending and by deſcending moiſture. I hope I may be able to preſent you a ſpecimen of an application of the four above-mentioned cauſes of exhalations to the meteorological obſervations of the preſent and former years, and, likewiſe, to the degrees of the epidemic which we have endured: notwithſtanding, pleaſe to remark, that in the year 1798, on the 11th of September, 127 new caſes were reported by the Board of Health, as appears by the *Philadelphia Gazette*; and 100 on the 1ſt of October. In theſe two deplorable inſtances of the univerſality of the epidemic, it may be ſeen by the exiſting meteorological tables, that the *heat* had been as high as 78 and 71 deg. and even higher, during the few preceding days; that the *moiſture* muſt have been very great, owing to heavy rains a few days before; that the *winds* had been ſo gentle or calm, on the W. N. W. and S. W. as to render the weather clear for five ſucceſſive days, and, conſequently, to promote exhalations. In fine, the then *decreaſing days* had produced morning and evening dews, which have been alſo remarked. All theſe circumſtances are included within four or five preceding days. If, now, we obſerve that all theſe new caſes, then reported to the Board of Health, and afterwards pointed out and publiſhed, could not be referred to the ſame day in which they were ſeen by phyſicians; that the greater number of them had been either taken ſick two or

* The dew bringing down with it, as it falls, peſtilential matter enough to poiſon the conſtitutions of men in a ſingle night. (Remarks on manures, by Profeſſor S. L. Mitchill. Med. Repoſ. vol. i. p. 38, firſt edit.)

three days before, or had been acted upon by the deleterious gafes fufficiently to produce the effects fome time after, we muft conclude, that fo great a number of fick, in a deferted town, was a fatal proof of highly noxious and concentrated exhalations exifting in our atmofphere, agreeably to the four promoting caufes. In the laft prevalence, the fever was almoft always confined to certain low parts of the town and fuburbs: the number of cafes were but few, owing to repeated changes, to long N. E. winds, to frequent drizzles, rains, cloudy and cool weather; yet, in two inftances, in the month of September, I have obferved the fame caufes, and the fame effects, in proportion, though in a very fmall degree.

Thus, Sir, we may have *atmizological* tables to afcertain the prefence of peftilential or feptic gafes in the orbit where we breathe; and when we fee that we are furrounded with materials for putrid fermentation, what further doubt can remain in fupport of the doctrine of importation? This word, as you juftly obferve, is a "*mercantile term*, technically underftood by thofe who have commercial modes of thinking;" and, I add, Sir, that, under their influence, too many people, unaware of the laws of nature, would readily circumfcribe her neceffary operations within certain latitudes, juft as natural produce to certain foils, and manufactures to certain nations.

I here fubjoin feveral queftions, which, I believe, fhould all be anfwered *negatively*, by any philofopher or phyfician, before he would, with conftftency, adhere to the doctrine of importation.*

1. What is the nature or chemical analyfis of gafes deleterious to animal life?

2. Is there any malignant or peftilential fever which is not produced by a deleterious gas externally received or internally formed?

* Profeffor Mitchill has proved to the world what are the fources, combinations, and venomous effects, of fepton (azote). The identical nature of our epidemic, in different years and places, proclaims the truth of the difcovery, and I adhere to the doctrine. But the field of chemical inquiries is not exhaufted. As there are other kinds of malignant and peftilential fevers, we muft, probably, acknowledge other kinds of deleterious gafes. What is that bluifh, inflamed meteor of the defert, called the fimoom? What is that other peftiferous wind of the occidental coaft of Africa, called, I believe, the harmattan? What is it emitted by the Grotto del Cano? What variety of combinations muft take place with the ambient elements, with the latent heat, with the unknown acids, and with the folutions of primitive earths? and from fo many different fermenting fources, to which future refearches will trace all the different kinds of plagues in the world.

3. Are there not as many different ſorts and degrees of malignant and peſtilential fevers as there muſt be various ſorts and actions of venomous gaſes?

4. If certain materials in putrid fermentation, and certain combinations of their conſtituent principles breed, malignant diſorders, what objection is there againſt believing, that the ſame materials, and the ſame combinations, produced the yellow fever in the Iſland of Hippocrates, in the French fleet from Siam, in the Weſt-India Iſlands, on the coaſts of Mexico, and in North-America?

5. If the putrid materials which produce the plague in the Levant were neceſſarily to be imported from one place into another, to create in the latter a ſimilar diſorder, what difference would remain between the doctrine of the domeſtic origin, and that of the importation?

6. Do we find, in hiſtorical records, ſufficient proof, that a fever, called the plague, had been ſucceſſively imported into all populous towns of Europe; that every where it was identically the ſame diſorder; and that, in every inſtance, it was evidently traced to the ſame ſource? And, finally,

7. What doctrine muſt be derived from thoſe of jails, camps, crowded hoſpital ſhips, marſhy places, &c. being the natural ſources of certain malignant and peſtilential fevers?

An anſwer to each of theſe queſtions, from enlightened and unprejudiced minds, would better evince our proofs of the domeſtic origin, in almoſt all inſtances of prevailing peſtilential fevers. I will even venture to ſay, that the memorable peſtilences of many celebrated towns of Europe, were not all traced to the Aſiatic ſource, nor that they were identically the ſame diſorder. In my opinion, Sir, many were yellow fever, as well as what Hoffman calls anomalous malignant fevers—the offspring of local putrid ſources, and of floating exhalations.

I have attended, this year, to a few obſervations on the nature and treatment of the yellow fever. The firſt is that of the total or gradual ceſſation of organical irritability which the deleterious or ſeptic gas produces. To a power which, in a great meaſure, deſtroys the excitability, and thus deprives the organs of their reſpective functions, though the neceſſary ſtimuli would be applied, we can eaſily aſcribe thoſe ſymptoms, peculiar to the yellow fever, of ſo little pain, of ſuſpended thoughts, of ſtupid or dull countenance, of erroneous ſenſations of hunger, and of deliberate reſolution to dreſs, walk, and exerciſe, contraſting with the moſt deplorable ſtate

of animal putrefaction, and even with the agonies of death. Few cafes are feen with continued inflammatory fymptoms; and when thefe take place (in the beginning only), they prove the re-action of the exifting irritability of certain parts on thofe which have already loft it. It is more than probable, that the liver, always found, by diffection, to be of a nankeen colour, is the firft of the vifcera deprived of its excitability: of courfe, an immenfe column of blood is repelled from, and forcibly diftributed into, the abdominal veffels; and thefe are the caufe of the firft tumultuous effects experienced in their refpective regions. Then the ftomach is convulfed, either by the turgefcency of the *vafa brevia*, or by torrents of bile poured into the duodenum, in confequence of the contraction of the liver; for contraction of fort parts is always effected, if circulation in their veffels is but feeble.

I thought I found proofs of this firft fubverfion in feveral fortunate cafes, and happy moments, when an innocent, but ftimulant remedy, having reftored fo much of the loft irritability, the patient immediately recovered from the moft alarming ftate, and retained no fymptoms whatever of what is called *acrid or corrupted bile, poifonous or cauftic juices, and contaminated blood.* It will appear to others, that the *fedative* operation of feptic gafes extends from the heart to all the veffels and mufcles. Indeed, if it was fo, we might alfo underftand why a feeble, red fuffufion, is perceived on all the parts of the body, until it is changed and replaced by the yellownefs. In fine, one or the other fuppofition, or both together, will explain the regurgitation of the blood in cavities, where it forms black matter, or the mufcular relaxation which fets it loofe to produce fatal hæmorrhages. In feveral diffections, in fact, I have feen that the parts from which it was fet loofe were black, and that it had affumed that colour. Every where it diftended the veffels, even in the lungs. But a ftill more ftriking obfervation is that of Mr. Jacobs, a young and diftinguifhed anatomift in this univerfity (Pennfylvania), who has minutely traced the greater influx of that fluid to its gravitation, and the fulnefs of blood-veffels to their declivity, relative to the fituation of the body. The fucceeding yellownefs muft, therefore, refult from the ftagnation of fome blood in the capillaries, which, by want of mufcular irritability, cannot be expelled, fecreted nor renewed: and, as we fee that ftagnation of the blood, in ecchymofis, always, or more or lefs, effects a jaundice in their contiguous parts: alfo, ftagnation of that fluid, in the capillaries, muft produce a general

jaundice in the yellow fever. This aſſertion is ſupported by another obſervation. Were it true that the bile is infuſed from its reſervoirs into the vena cava, or abſorbed by and through the lymphatics, the inmoſt receſſes of the circulation would then receive it ſimultaneouſly, by a neceſſarily regular diſtribution. Contrarily to that effect, Sir, irregular yellow ſpots, contraſting with florid redneſs of contiguous parts, if I am not miſtaken, are the ſure marks of the laſt ſtage of the yellow fever.

This little ſketch of mine ſhould now require ſome proofs *à priori*, in fact, why deleterious gaſes, whether nitrous, hydrogenous, or carbonic, &c. have a ſedative power on animal irritability. I ſay they have, becauſe deaths from ſuffocation or *aſphixiation* do not leave any ſenſible effects of diſorganization; and becauſe the experiments of Meſſrs. Fontana, Carminati and others, have evinced, that animals, expoſed to fixed air, have loſt their irritability, and that their muſcles were no more ſenſible to thoſe ſtimuli by which they ought to have been contracted. Fourcroy has himſelf aſcertained the fact, that the heart, that ſtrongeſt muſcle, will loſe all its irritability by the effect of certain poiſons, and by what he calls *fluides mephitiques*. It may be objected, that as ſudden death is the natural effect of being expoſed to concentrated deleterious gaſes, it is not likely that they would create fevers of a lengthy ſeries of ſymptoms, and of differently marked ſtages. Why ſo, Sir, if theſe gaſes, expanded and diluted in the atmoſphere, can but partly exerciſe their ſedative power on one or another organ, and if they operate like a *ſlow aſphixiation?* Do we not ſee a ſimilar ſucceſſion of febrile ſymptoms, of different ſtages, forming an acute diſeaſe in bodies poiſoned by the bite of certain inſects, ſnakes and vipers? I have it from good authority, that, in Martinique, the bite of a ſnake has, in ſeveral inſtances, produced ſymptoms ſimilar to the malady of Siam, or yellow fever.

Profuſe bleeding, in the treatment of this epidemic, has been again preſcribed by ſeveral eminent phyſicians, and the ſucceſs of this remedy has been evinced by remarkable cures. It is, in fact, the moſt rational, becauſe a rapid circulation, when animal excitability is impaired or weakened, muſt neceſſarily promote the corruption of the blood. This is the reaſon why patients, in that diſorder, emit a ſtrong ammoniacal effluvium particularly when their ſkin is dry, and which is diſengaged in proportion to the heat of their bed and of their room. It is alſo propelled from the inmoſt receſſes of circulation, as ſoon

as proper remedies are exhibited to raiſe the excitability, and promote the ſecretion of the capillaries.

I am not ſatisfied that other remedies poſſeſs any direct or ſpecific power in the yellow fever, beſides what is familiar in correct medical practice. I employ calomel, in moderate doſes, as a draſtic, and as an admirable evacuant of the alimentary canal, and of the whole frame. In it we ought inceſſantly to diffuſe the action of ſtill more ſtimulating medicines, to keep up or to renew the expiring irritability of the heart and other viſcera. There is no diſorder, I believe, in which violent medicines can be adminiſtered with ſo little danger, and with ſo frequent ſucceſs. Profeſſor Ruſh informed me, ſome time ago, that he had given, to a young patient, four times the uſual doſe of tartar-emetic, without producing any other effect than a gentle and ſalutary evacuation of the bowels. This would be incomprehenſible to any body unacquainted with the ceſſation of irritability, or with the ſedative power of an active poiſon. This is not the firſt inſtance in which that phyſician ſtrove hard for the good of the patient left to his care, and for the honour of ſcience.

Had I not, perhaps, already exceeded the limits aſſigned to a ſingle correſpondent, I would ſubjoin further obſervations on the method of ſalivating, and on the queſtion of the contagious quality of the yellow fever. I apprehend that the former is ſtill ſubject to great objections; and I fear that, in the latter, we do not well underſtand each other. But I will trouble you with another letter on theſe intereſting ſubjects.

I read the pamphlet you mentioned to me, a copy of which was given by the Secretary of State. Indeed, my curioſity received very little ſatisfaction, particularly in what Mr. Cathalan has been pleaſed to call, *An anſwer of the Phyſicians of Montpellier and of Marſeilles.* The few phyſicians who have ſigned thoſe pieces, and who probably have never ſeen the yellow fever, nor read any correct account of its ravages in this part of the world, could not be adequate to the taſk of giving any better inſtructions than the faculty of Philadelphia and New-York. The very name of the yellow fever was abſolutely unknown in France, and ſo much ſo, that theſe gentlemen, when obſerving what different characters have been remarked in peſtilential fevers, and in the yellow fever, have referred themſelves to old Engliſh authors, omitting two of their more recent writers, and eminent phyſicians, Meſſrs. Pouppé Deſportes and Dazille, who have reſided in Hiſpaniola, and profeſſedly treated of the ſame fever, but under

the name of *Maladie de Siam*. They have been alſo unaware that the American plague was identically what the French call *La Matelotte*, well deſcribed in the Treatiſe of the *Maladies des Gens de Mer*. I think, however, that their enumeration of the documents they would wiſh to have received is remarkably accurate. Their anſwer to the firſt queſtion, on the beſt preventative diet and regimen, is, in many reſpects, applicable to the people of this climate. Their method of treatment is ſurely widely different from that which experience has ſhewn to be the beſt in theſe parts, and in ſuch a fever, though it may be very good for malignant fevers, under a climate famous for the lively influence, and *exceſs of irritability*, which it diffuſes in the living body. After all, if I take the liberty to juſtify theſe few individuals from the reproach of appearing to have retrograded a whole century, it is becauſe I preſume their experience has ſufficiently convinced them, that their *antiquated ideas* are yet beſt adapted to the peaceable enjoyment of life, and of ſcientifical acquirements, which inteſtine diſcords and horrid wars have inceſſantly interrupted.

I remain, Sir,
With reſpect and affectionate ſentiments,
Yours, &c.

FELIX PASCALIS.

ARTICLE VI.

DESCRIPTION *of a* CABINET *of* COINS *and* MEDALS, ANCIENT *and* MODERN. *By* JOHN C. KUNZE, *S. S. T. D. and Senior of the Lutheran Clergy in the State of New-York; in a Letter to Dr.* MITCHILL, *dated March* 19, 1800.

Dear Sir,

WITH pleaſure I comply with your requeſt, to give you a ſhort deſcription of the little cabinet of coins in my poſſeſſion. It would be the extravagance of curioſity, bordering on the luſt of the eyes, had I made this collection only for my own two eyes. I can therefore have nothing

againſt its publication, provided it is well remembered, that I do not attach any idea of greatneſs to it. Againſt ſuch a ſuppoſition revolts my own conſciouſneſs, that I am not quite ſo ignorant of the ingredients of a good cabinet: for though I have not ſeen many, I am not without the literary means of forming a juſt idea of ſuch a thing. But great and ſmall being relative terms, permit me to ſay, it is a large one in New-York, and to continue this language till I ſee a more extenſive one in this place. At any rate, the foundation for a good one is laid. If the heir to my library, of which I conſider it as an appendant, has not a good and extenſive one, when he comes to my age, I committed an error of judgment in making my will.

I have placed my coins on little mahogany boards, fitted for their reception by a turner; but many are yet looſe in a cheſt. They are, as uſual, divided into gold, ſilver, and braſs.

The golden board proves obſtinate to prolification, for reaſons which may be obvious to you. I have ſown thirty pieces on that ground, and they will not multiply. Yet moſt of the gentlemen who hitherto deigned the little collection worthy of their view, were more pleaſed with this board than with all the reſt, particularly after I had aſſured them, that with them I was not able to buy a pound of butter in our market. This I did ſometimes to check their expatiating on ſeeing me have ſo much money, whilſt I, at the ſame time, repeated in my heart that old ſigh, *O tempora! O mores!* I have a penny of ſilver from Charles I. which does not cover the top of my little finger, and it is worth more than my largeſt gold piece, which weighs eighteen penny-weight.

In this board is a piece of Ferdinand and Iſabella Cathol. with their faces; one of Charles XI. of Sweden. The reſt are more modern, of different nations, as Pruſſia, Saxony, England, Portugal, &c. not our own eagles, half and quarter eagles, omitted. A few are medals of fine workmanſhip, and judicious emblems; one repreſenting the city of Ratiſbon. All of no great value, except that of the maſter of our Columbus.

In my ſilver boards there are fifty-three of dollar ſize, and thirteen of half-dollar ſize.

The copper boards contain fifty of the dollar ſize, and likewiſe thirteen of that of half a dollar.

The ſilver pieces of a ſmaller ſize amount to three hundred and thirty-four, and the copper of the ſame deſcription to four hundred and twelve.

My ſilver boards contain only twenty-ſix of high antiquity; and the copper boards, in large braſs, eigthteen, and in ſmall braſs, twenty.

OF THE SILVER COINS.

Board 1ſt contains, beſides the twenty-ſix mentioned, a few moderns. Among thoſe of antiquity is one with the word triumviri, and the prow of a ſhip, which is on the moſt ancient Roman coins, pointing at Janus, who arrived in Italy by ſea. A piece with the Pythia ſitting on the trevet. One with the inſcription, Cai. Jul. Cæſaris divi patris Filius Auguſtus. One with, victoria Auguſti; and, on the reverſe, imperator Caes. Auguſtus Coſs. iiii. of conſequence, that ſtruck in memory of his Actium-victory, which gave him the ſupreme power. The image of the emperor is very expreſſive and clear. Others are of different emperors and kings. Thoſe of Alexander Severus are of baſe metal. Pinkerton aſſerts that he began to ſtrike ſuch money. Three are of his wife, in confirmation of hiſtory, which ſays that ſhe meddled much with the government of the State. Several are of Hadrian, one of Galienus, of the baſeſt metal. One of Marcus Aurelius, and another of his deteſtable conſort Fauſtina. One of Domitian, whoſe copper coins are common, but thoſe of ſilver very rare. Here is likewiſe an Otho, and one of Trajan, with optimus princeps; and, on the reverſe, rex Parthar. which belongs to the moſt valuable.

Board 2d. Fifteen pieces of a dollar ſize; among which is a Daniſh piece of 1697, with the images of Frederick, hereditary prince, and Louiſa of Mecklenburg, his ſpouſe; on the reverſe, a genius with a child, and the inſcription, Felix Danorum genius; under it, Chriſtianus born 1697. One, very large and thick, of Frederick III. with eighteen coats of arms. One of George William, Duke of Brunſwick, of the year 1567. Another of Frederick Ulrich, of the ſame dukedom: on the reverſe, a wild man, with a tree in his hand, and the year 1616. A Dutch one of 1650. One of the ſame kind and country of 1771. It is a curious contraſt with reſpect to the appearance of the ſilver. All ſilver, preſerved a long time in Holland, looks like lead, on account of the humid exhalations of that country. One of Louis XIV. of 1694. One of Maria Thereſia, of 1763, with a very expreſſive image of her. A large piece of Peru and Potoſi, bearing the inſcription of Charles II. This is of a metal

called electrum, gold mixed with ſilver. A fine medal of Frederick II. Landgrave of Heſſia, with a repreſentation of the city of Franckenberg, and the mines in its vicinity. One of Frederick, Margrave of Anſpach, who is repreſented in military dreſs on horſeback. A medal repreſenting the jubilee of the reformation, celebrated in the year 1717, with the city of Augſburg, and ſeveral other things. A Saxonian dollar, with the preſent elector.

Board 3d contains fifteen other pieces of the ſame ſize, among which is a Saxonian piece, with the image of John Frederick on one ſide, and George, Duke of Saxony, on the other, with the year 1535. Another of the ſame country, of John, George and Auguſt Chriſtian, with the year 1592, with their images. Another of that country, of 1598, with the inſcription of John Caſimire and John Erneſt. The former was of the Albertinian, and the latter of the Erneſtinian line. A Dutch piece of 1576. A Swiſs piece of 1621, with a bear, and the inſcription, civitas Sangallenſis. A Brunſwick piece of the year 1696. Of Saxony another, of the year 1542, with Mauritius, Duke of Saxony. One of Maria Thereſia, repreſenting her dominions in Flanders. One of the preſent King of Naples, of 1794. One of Guſtavus III. of Sweden, with his image, of 1776. One of the Emperor Ferdinand III. on the reverſe, Reſpublica Nurembergenſis, of 1631. A Spaniſh piece of Phil. II. of the year 1591. A medal repreſenting Neptune, with the inſcription, halcionibus ſubductis, of the year 1597, from the Senate of Amſterdam. A piece repreſenting the mines of Holzapfel, from Charles Louis, Prince of Anhalt-Shoumburg. A Bavarian dollar of 1772.

Board 4th contains the reſt of ſilver pieces of a dollar ſize, except the Engliſh. There is a fine Dutch piece of 1794. Some French crowns. One with the image of the unfortunate Louis XVI. and another without it; both of 1793. One of Ferdinand II. Emperor of Germany, of 1690. A Straſbourg piece of the year 1694. An old Spaniſh dollar, of a quadrangular figure.

Board 5th conſiſts of thoſe in ſilver of the half-dollar ſize. Here I only obſerve one of John V. of Portugal. One of the City of Aaken, with the inſcription (expreſſive of its rivalſhip with Frankfurth), urbs regalis, regni ſedes prima regum ſedes principalis, locus coronationis Cæſareæ, urbs Aquenſis. The Emperor was formerly crowned at Aaken; but, at preſent, this is done at Frankfurth, the place of election.

But Frankfurth muſt, after every coronation, give a reverſe to this imperial city, that the privilege belongs to Aaken. A fine piece of Louis XV. of France, of the year 1754, with an inſcription rather idolatrous—fulget ab aſpectu. A piece of Lubeck, of 1549. One of Portugal, with Maria I. and Peter III. A Swediſh piece of Adolph Frederick, of 1763. One of Frederick William, late King of Pruſſia, of 1787. A Jewiſh ſhekel in ſilver. Though I believe, with Mr. Pinkerton, in his Eſſay on Medals, that no genuine one is to be had, I cannot coincide with him in the opinion, that it is a diſgrace to any cabinet to have one, nor in his emphatically ſtiling the Jewiſh nation a barbarous one. The piece gives, undoubtedly, an exact repreſentation of the ancient ſhekels.

Board 6th contains twenty-four pieces. One of Charles VI. Emperor of Germany—though I beg leave to obſerve here, that I never heard of an Emperor of Germany before I came to England and America. Theſe princes are called the Roman Emperors; and although they are extremely poor as ſuch, having not more than twenty-one feudal tenures near Rome, yet their power and wealth in Germany are likewiſe not much more than nominal. Other pieces are of Bavaria, the Palatinate, Hanau, Brunſwick, Bareuth, Heſſia, Saxon-Gotha, Trier, Mainz; others of Holland and Denmark.

Board 7th, containing thirty-one, has a papal piece of Benedict XIV. with the reverſe of St. Petrus apoſtolus. Another of 1740, inſcribed, illuminet corda noſtra, the Holy Ghoſt, and ſede vacante. A Ruſſian one of Catharine II. of 1769. One of the laſt Saxonian King of Poland, ſtruck in the year of his death, 1763. A Ruſſian from the Empreſs Elizabeth, of 1761. Another papal of Benedict XIV. with the inſcription, tota pulchra es, and a repreſentation of the church. Some of the Emperor Leopold, of 1664, 1661. A papal one of Clemens XII. on the reverſe, ſacroſanctæ Baſilicæ Lateranæ poſſeſſio 1733. The reſt are Dutch—of Wirtemberg, Bamberg, Bavaria, Heneberg, Heſſia, Swiſs, Daniſh, Auſtrian, Spaniſh, French. One of George I. where the reverſe gives an account of his birth, elevation to the electorate, to the Britiſh kingdom, and of his death.

Board 8th contains ſixty-one pieces, among which are four of Maſſachuſetts, of 1652, all of different ſizes. Three Turkiſh, very thick, of fine ſilver, of different ſizes. An Arabian one—a medal on the peace of Ryſwick. Another

Arabian, with the year of the Hegira, 1187. Another with the number 632 moſt curious. A piece of Sigiſmund Auguſt, King of Poland, of 1557. A piece of Loretto, with the inſcription, civitas virginis. Beſides Pruſſian, Straſburg, an old French piece of Henry III.

Board 9th contains fifty-one pieces, among which I mention only a medal on rural pleaſure, in very fine ſilver, and Pruſſian and Saxonian groſhes, ſtruck before, during and after the ſeven years war. The Saxonian one, ſtruck during the war, looks entirely black; yet I remember very well how often I had to buy a breakfaſt with it. One ſtruck by the Elector of Saxony, as proviſor of the empire—a true rarity. Beſides them, there are, on this board, pieces of many biſhops, and ſeveral imperial ones, of Leopold, Charles VI. Maria Thereſia, &c. One of George I. is of very fine ſilver. Thoſe of the Britiſh kings, in theſe boards, are Hanoverian pieces.

Board 10th contains thirty-five pieces, moſtly Swediſh and Daniſh. One of Charles XII. Some of Lubeck, Hamburgh, Holland.

Board 11th, containing forty-three pieces, conſiſts, for the moſt part, of French and Spaniſh. One is of Charles II. of Spain, of the year 1674. One of Charles V. or, in Spain, I.—a great rarity, but much defaced.

Board 12th contains forty-ſeven pieces, among which is one with the inſcription, jubilæum ſecundum eccleſiæ Lutheranæ, 1717, with verbum Domini manet in æternum, and the name Ernſt Ludwig, Landgrav. Haſſiæ. Another, with the inſcription, an Heller, yet of fine ſilver, with the name of the place, Frankfurth. It is a piece of the money thrown among the people at the coronation day. Another jubilee-piece, with a very exact likeneſs of Luther. A papal piece of Clemens XII. with the inſcription, in cibos pauperum. A fine piece of Stolberg, with an elk. A very old Portugal piece, a ſubject yet of future ſcrutiny.

Board 13th contains, at preſent, only twenty-two pieces, among which are, a Swediſh dollar from Guſtavus of Sweden, of the year 1543. A fine ſilver medal, on Chriſt giving the keys of heaven to Peter (papal). Another, of the ſame fineneſs, repreſenting the Lord's Supper, with all the words of the inſtitution on the reverſe (a Proteſtant piece). A medal on the coronation of Joſeph II. as King of the Romans, of the year 1764. A curious quadrangular piece, ſtamped 8. groſhen; and, on the reverſe, Minda obſeſſa A

piece of Louis XVI. for the colony of Cayenne. A medal with his likeneſs. A Saxonian piece of the year 1710. One of the Emperor Joſeph I. of 1708. A fine Marien-groſhen of 1626. Another of 1682.

Board 14th contains my whole collection of Engliſh pieces in ſilver, amounting, as yet, only to forty-ſix.

The largeſt, above the dollar ſize, repreſents George II. with a tree, a ſun, and an Indian, with the words, Let us look up to the Moſt High, who bleſſed our fathers with peace. A crown of Charles II. One of Queen Ann. One of William III.—Of half dollar ſize the following: Of Charles II. James II. William III. William and Mary, with the two images. A medal on Maria, with her very expreſſive image, and the motto on the reverſe—O Dea certe. A medal on Queen Ann's inauguration, with the inſcription, Vicem gerit illa tonantis (a deteſtable ſound to an American ear), with April 23, 1702.—Of a ſmaller ſize are the following: Four of Elizabeth; one of 1573, one of 1594—one expreſſing her face very clearly. Several of Charles I. one a very rare penny, valued at £ 10. One of Henry VIII. One of another Henry, with civitas Cantor. What Henry? is yet an object of inveſtigation. One of Edward VI. with his face. Some ancient Scot's pieces. One with Jacobus and villa Edenburg (not Edinburgh). One of Philip and Maria, King and Queen of England, of the moſt conſummate rarity. The reſt are of Charles II. Ann, William, William and Mary, the three Georges, James II. ſome of the moſt minute ſort. One Iriſh piece, ſtamped, heart of oak.

OF THE COPPER COINS.

Board 1ſt contains eighteen pieces of high antiquity, and twelve others.—Of the firſt ſort are many common, but ſome extremely rare and precious. Nero's, Domitian's and Veſpaſian's, are common: but one of Germanicus, ſon of Nero Druſus and Antonia, Pinkerton values at £ 15 ſterling. There is one of Julia Mammaea, mother of Alexander Severus. One, in Greek, of Hadrian with Antinous, worth £ 3 ſterl. The reſt in this board, not belonging to the above-mentioned eighteen, are Ruſſian and Venetian, with St. Mark, and two kinds of Swediſh, of 1557 and 1732.

Board 2d contains twenty-five pieces of high antiquity, and twenty-ſix of a more modern date. Several, but all different, of Conſtantine the Great. One of Probus. One of Nume-

nianus. One of Conſtantius, with the reverſe, gloria exercitus. One of Conſtans. One of Licinius, &c.

Among the others is the whole ſet of dollars, in the ſhape of ſmall pennies, ſtruck by Charles XII. King of Sweden, with Jupiter, Mars, Neptune, &c. from the year 1715 to 1719; for which impoſition Baron de Goerz loſt his head. The moſt rare among them is that ſtamped Poppei. The reſt are Ruſſian and Spaniſh. Two of Philip III. and two of Philip IV. Portugueſe, French, and ſome medals.

Board 3d and 4th contain, of a dollar ſize, the whole ſeries of Britiſh kings, from the conqueſt to George II. inclusive, ſtruck in the year 1740, by Dacier, a native of Geneva, upon the fineſt copper, reſembling the moſt exact countenances of the kings, and admired by every ſpectator on account of the workmanſhip.

Board 5th contains ſix pieces of a dollar-ſize, and twenty of a leſſer. Four Ruſſian kopekes, of different years. A medal repreſenting the battle of Roſbach. One of Frederick the Great, of Pruſſia. One of George II. A piece of James II. of 1689. Another with the not very democratic inſcription, Floreat rex, pereat plebs. A Spaniſh piece of 1611, &c.

Board 6th contains eight of a dollar ſize, five of half a dollar, and thirteen of a leſſer ſize, moſtly medals. One repreſents Admiral Boſcawen taking Cape-Breton, with the fortreſs of Louiſbourg. One Admiral Vernon's naval victory. Another William Pitt. One Mr. George Whitefield.—Of the ſmaller ſize, I only notice Queen Charlotte, Queen Caroline of George II. Admiral Vernon (another), Commodore Brown. One on the alliance of England and Pruſſia, with the faces of the two kings. A Sicilian piece of 1500. One with the faces of the King of Pruſſia and Prince Ferdinand. A Chineſe penny.

Board 7th contains twenty-four pieces, among which are the Marquis of Granby. The mother of King George III. with the motto, on the reverſe, A much injured victim. King George and Caroline. George III. and Charlotte. A coronation piece of both. One of the Duke, another of the Dutcheſs of Glouceſter. One with Roſa Americana. Another with Voce populi. Iſle of Man pieces with the three legs. William and Maria, with Vita poſt fata ſuperſles. Some of James II. with Nemo me impune lacceſſit—the trueſt royal falſehood.

Board 8th contains twenty-four pieces, among which is one of Louis XIII. Two Arabian pieces of different ſizes.

Some very old Ruſſian and Spaniſh—the Spaniſh all of the ſixteenth century.

Board 9th contains forty-eight pieces, among which are, one of the Prince of Wales, with the uſual motto. Ich dien. Two of Louis XIII. A China penny. One of Charles II. of Spain. A Sicilian piece of Charles II. A medal of the Prince of Orange. A much valued penny of Ann, flat on one ſide. A much valued piece, with Carolus a Carolo. A Portugueſe penny of Peter II. with Moderato ſplendeat uſu. Some very curious, which I am not yet able to explain.

Board 10th contains forty-eight pieces, among which are pennies, hellers, kreuzers and ſtubers, moſtly of all provinces of Germany. One of Frederick, of clear copper, yet ſtamped with Moneta argentea. Such was this monarch's power. One repreſenting the proſperity of the Engliſh church.

One hundred and twelve other copper pieces are not yet placed on boards. They contain Engliſh, Scotch and Iriſh pennies, marks and medals of various mottos, and ſome of exquiſite workmanſhip.

My duplicates I have in a particular cheſt, from which every ſpectator is permitted to take what he pleaſes, by replacing each with a coin, of any value, which is not yet in the collection.

I am, with ſentiments of high eſteem,
Sir, yours,

JOHN C. KUNZE.

ARTICLE VII.

On the DISEASE *called the* LAKE-FEVER *of the* WESTERN COUNTIES *of the* STATE *of* NEW-YORK. *In a Letter from* JOHN W. WATKINS, *Eſq. of Tioga, to Dr.* MITCHILL, *dated January* 1, 1800.

Dear Sir,

I HOPE the account which I tranſmit you of a fever that attacked my ſettlement, and the weſtern counties of this State, in the year 1795, the ſame year that it ravaged the city of New-York, will be acceptable to you. For more correctly determining its origin, I have prefaced it with a deſcription of the lake and adjacent country.

The Seneka Lake is a water of forty miles in length, and from two to five miles in width, remarkably clear, and of great depth: in ſome places a line of one hundred fathoms has not found bottom. The ſtreams that fall into it are neither numerous nor large. It is never known to freeze, except at the north end, where the water is ſhallow, and the bottom a fine ſand. It is, in ſummer, very cold, and ſteams and vapours ariſe from it in cold winter weather. When firſt immerſed into as a bath, it gives a very ſenſible and ſharp ſhock, but preſently becomes delightfully pleaſant. As it mixes well with ſoap for waſhing, it can be but very little impregnated with any acid. The rocks which form its banks lie in horizontal ſtrata, of different thickneſs, of a hard, brittle ſtone, of a ſhiſtic or flaty nature, which, when put into the fire, flies in it pieces, with a conſiderable exploſion, like oyſter ſhells. Many quarries of lime-ſtone are found in its vicinity.

At the ſouth end of this lake, in the direction of the lake, is an extenſive valley, of about ſix miles long and one wide, bounded by high hills, from which ſeveral ſmall ſtreams of water proceed, and which, no doubt, by the earth brought down with them, have made this encroachment on the ancient limits of the lake. For the firſt three miles of this valley, during the greater part of the months of April and May, a large proportion of it is covered with water, occaſioned by the lake being, at this ſeaſon, at its higheſt elevation. As the lake ſubſides, the water gradually dries off, leaving a very rich ſoil, covered with aquatic plants and animals. Theſe not being able to reſiſt the autumnal heats, ſucceſſively die. The nauſeous exhalations from them are ſtrongeſt, and only to be obſerved at a diſtance, very early in the morning.

At this end of the Seneca Lake I formed my ſettlement; and, in the year 1795, had about twenty men employed, collected from different places. They were plentifully ſupplied with liquor and proviſions, excepting vegetables. As the heat of the ſeaſon increaſed, they ſucceſſively grew ſick. In ſome inſtances they lingered before the height of the fever, in others the attack was ſudden and ſevere. The eyes of the men were inflamed, and very yellow, which was a ſure ſymptom of the approaching complaint. The face, at firſt, was very much flushed, and they complained of exceſſive pains in the back, head, and limbs, and of great oppreſſion in the breaſt, with a very ſick ſtomach. The ſkin was very dry, and the bowels affected with an obſtinate coſtiveneſs. As ſoon as the latter was removed, and perſpiration brought on, the ſick man was

ſeldom long confined. On one man, repeated clyſters and portions of calomel had no effect, and no kinds of teas could procure perſpiration. His complaint grew ſo inveterate, that he became covered with black ſpots, was occaſionally ſeized with violent convulſions, inſomuch that the ſtrongeſt men could not keep him in bed; and, although kept clean, was exceſſively offenſive. In this ſituation I cauſed him to be put into a large caſk of warm water. The firſt immerſion produced a plentiful perſpiration; and, after the ſecond, the medicine he had in him operated. The man recovered.—This diſorder produced a univerſal yellowneſs over the whole body, and is termed, in that country, the LAKE-FEVER. During the ſeaſon I have been ſpeaking of, it was very prevalent over that region, particularly in the neighbourhood of ponds and marſhy grounds. It has been leſs rife ſince that time: and although it ſo violently attacked thoſe people that ſeaſon, which was remarkably warm and ſultry, I have known but two caſes of a ſimilar fever in that neighbourhood ſince. It is evidently occaſioned by the poiſonous ſeptic gas, emitted by putrefying animal and vegetable ſubſtances of every kind, abounding in a country in a ſtate of nature.

The clearing of the land, aided by the ſtrata of calcareous earth in the ſoil, will effectually, I hope, prevent the return of this diſtemper, ſo like the yellow fever of your ſea-ports.

With reſpect,

I am your humble ſervant,

JOHN W. WATKINS.

ARTICLE VIII.

SINGULAR CASE *of* DROPSY: *Communicated in a Letter from Dr.* CHARLES SMITH, *of New-Brunſwick, New-Jerſey, to Dr.* J. R. B. RODGERS, *Profeſſor of Midwifery and of Clinical Medicine in Columbia College.*

Dear Sir,

A CASE of chylous dropſy (if I may uſe the expreſſion) lately occurred in my practice, which I judge to be rather an uncommon one; at leaſt it is new to me, and my memory does not ſerve me with a ſimilar inſtance on record, brought to a favourable termination.

In December of laſt year, T. L. of South-River, applied to me for worm medicines for a boy of twelve years old, deſcribed to have an enlarged abdomen, and very inſatiable appetite. Calomel, pink-root, &c. were adminiſtered and repeated without any beneficial effect. On viſiting the lad afterward, it appeared evident that his abdomen contained a large quantity of ſome fluid, ſo much as to prevent a recumbent poſture altogether. He laboured under none of the other ſymptoms of dropſy, ſuch as oedematous ſwellings, or much relaxation of the ſolids: he only appeared ſomewhat leaner than uſual.

The patient was brought to town, a few days after, and tapped. On withdrawing the ſtilette, you may judge our ſurprize to find a moſt pure, white and fragrant chyle, or milk, to follow, which continued to flow until we obtained between ſeven and eight quarts. This chyle had rather more of a chalky white colour than cow's milk. It was perfectly ſweet and pleaſant both to the ſmell and taſte; and, after ſtanding through the night, afforded a good cream, though not quite ſo much as is uſually obtained from the ſame quantity of cow's milk.

After the operation, the boy was reſtored to his uſual feelings, and, in fact, ſeemed to have no complaint, ſave a conſtant craving for food. He was taken home three days after, and I heard no more of him for fourteen days, when I was requeſted to viſit him in the country. I found him, in all reſpects, as before, ſave a greater degree of emaciation; and, by repeating the operation, I obtained a fluid of the ſame kind, and nearly the ſame quantity as before. From this time until the 20th of March I heard nothing of my patient: as his friends had determined to yield him to his fate, provided the laſt attempt ſhould prove unſucceſsful, I had, in my imagination, numbered him with the dead. Having occaſion to viſit the neighbourhood at this time, I was agreeably diſappointed in finding him in perfect health, without any intumeſcence of the abdomen, and with an appetite reduced to due moderation.

It is evident, from the circumſtances of the above complaint, that ſome of the larger chyliferous veſſels were either eroded or ruptured; and the emaciation which was taking place, and the ſhort ſpace of time which had elapſed between the operations, induced me to conclude the cure beyond the bounds of our art. I therefore contented myſelf with ordering a few doſes of calomel and laudanum, with a view to excite abſorption; but more with a view to ſatisfy the minds of thoſe con-

cerned, than from a profpect of any permanent utility. I adviſed an adherence to ſolid rather than fluid food; and, being requeſted, permitted a moderate uſe of Geneva.

On inquiry, I learned that no medicine of any kind had been given after the day of the ſecond operation; and, by the poſitive order of the miſtreſs of the family, the patient was entirely reſtrained from the uſe of every fluid except gin, and confined to bread, toaſted brown, and freſh meats, boiled or roaſted, without pepper or ſalt. This regimen was enforced, without the leaſt relaxation, for the firſt ten days. For the two ſucceeding weeks, a ſmall portion of water was ſometimes added to the gin, but never to exceed it in quantity. After which period, perceiving no tendency to the former complaint, the boy was permitted to return gradually to his uſual mode of living, and has ſince continued in good health. During the time of the above regimen, he was two or three times fairly intoxicated, and that too by deſign.

You will, doubtleſs, eſteem the above mode of treatment ſuch as would hardly have been ventured on by a judicious practitioner; and yet to it, I am inclined to think, the boy owes his life.

From the nature of the food and drink, the quantity of chyle generated muſt have been much leſs than uſual. And, admitting that a proportion of it was diſcharged into the cavity of the abdomen, we may ſuppoſe this to have been taken up by the increaſed action of the abſorbent veſſels of that cavity, excited into more than ordinary energy by the ſtimulus of the gin. The diſeaſed veſſel or veſſels being leſs diſtended than heretofore, would, of courſe, be more diſpoſed to heal.

If you, Sir, who are ſo competent a judge in matters of this kind, conceive the above caſe can be of any ſervice to the public, you have my permiſſion to diſpoſe of it in ſuch a way as may appear to you moſt likely to promote that end.

Query. How far would the above regimen ſucceed in aſcites, after the operation?

I am, dear Sir,
With much conſideration,
Your very humble ſervant,

CHARLES SMITH.

New-Brunſwick, (N. J.) Feb. 26, 1800.

ARTICLE IX

An Account *of* Febrile Diseases, *as they have appeared in the County of Cumberland, Diſtrict of Maine, from July*, 1798, *to March*, 1800: *Communicated in a Letter from Dr.* Jeremiah Barker, *of Portland, to Dr.* Mitchill.

THE ſummer of 1798 was unuſually hot and ſultry.—From the beginning of July to the laſt of February, 1799, an epidemic fever was very prevalent in ſeveral towns. None above forty, and but few young children, were attacked with the diſeaſe.

The uſual ſymptoms were, pain in the head, back, and ſometimes in the limbs; nauſea and vomiting; loſs of appetite; quick and ſometimes full pulſe; thirſt for water; great heat, generally preceded by chills. The face was ſuffuſed with redneſs, and the eyes were heavy and watery, and, in full habits, inflamed. In a few inſtances the whites of the eyes were yellow, and the ſkin was of the ſame hue. Hæmorrhages from the noſe ſometimes took place, particularly in the young and plethoric. The tongue was furred, and, in the progreſs of the diſeaſe, dry and dark-coloured. A diarrhœa, in ſome, occaſionally occurred, though coſtiveneſs was generally a troubleſome ſymptom. Pain in the region of the ſtomach, together with a ſenſe of foreneſs and tenſion upon the abdomen, frequently attended. A remiſſion of the fever in the morning, and exacerbation in the evening, were always obſerved. Deafneſs frequently took place in the decline of the fever, and a temporary delirium ſometimes occurred.

The violence of the fever generally continued eight or nine days, when it ſubſided, and marks of putreſcency in the alimentary canal were very apparent: in ſome caſes ſymptoms of putreſcency appeared at an earlier period, evidenced by dark green matter ejected from the ſtomach, and black fœtid ſtools.

One hundred and nine of my patients were confined to their beds: ſeveral others were ſlightly affected. Fifty-eight of the ſevere caſes, beſides ſeveral mild ones, occurred in Stroudwater village, adjoining the iſthmus of Portland, where

I reſided, and where I had an opportunity of paying particular attention to all theſe caſes, excepting four. Five died in this village; but I attended only one of the fatal caſes. In a neighbouring village I attended fifteen patients in this fever, and they all recovered. In all theſe caſes, excepting four of the fatal ones, alkaline remedies were liberally employed.

The recovery of many of theſe patients was beyond my expectation; but I aſcribed it to the ſeaſonable and liberal uſe of alkalines: for, among many other patients, in neighbouring towns, ſeveral died; and in theſe fatal caſes the alkaline remedies were either neglected or not duly adminiſtered, though the other remedies were regularly employed.

A woman, from a diſtant town, who viſited one of the ſick families in Stroudwater village, in January, 1799, was attacked with a ſimilar fever, in a few days after her return home, and died. During her ſickneſs three others of the family were ſeized with the ſame fever, two of whom died; and all neceſſary meaſures were employed, as the phyſician has ſince informed me, excepting alkalines.

The ſucceſs that has attended the uſe of alkaline remedies in this fever, not only in my hands, but in the hands of ſeveral of my brethren, has attracted the particular attention of many among as; ſo that, unleſs a patient is under a courſe of alkalines during the fever, we are accuſed of neglecting the moſt neceſſary means: for it has been frequently obſerved, that when theſe remedies have been neglected, however judicious the treatment was in other reſpects, ill ſucceſs has generally been the conſequence. In Stroudwater village two patients had a yellow ſkin. One of theſe died; and in this fatal caſe alkalines were not employed, though other remedies, as I am informed, were not neglected.

I attended ſix caſes in July, ſixteen in Auguſt, twenty-five in September, twenty-four in October, nine in November, eight in December, fifteen in January, and ſix in February.

It is remarkable that the greateſt degree of mortality happened in the winter months, when the weather was extremely cold, and the earth loaded with an unuſual quantity of ſnow. Perhaps the patients being confined in warm, tight rooms, ſecluded from pure air, increaſed the malignancy of the diſeaſe; for in this ſeaſon ſymptoms of putreſcency were more apparent.

Blood-letting, in full habits, eſpecially in the ſummer and fall months, was evidently beneficial; and bliſters, in caſe of local affection and delirium, always afforded relief

Cleanſing the ſtomach with ſome ſuitable vomit was invariably attended with good effects, as well as purging the inteſtines with cathartics. But when emetics were omitted, however liberally catharties had been employed, unhappy conſequences frequently enſued.

I have long been perſuaded that cathartics do not properly cleanſe the ſtomach. The ſituation and ſtructure of that viſcus, ſuſpended, as it were, by both ends, and lined with folds, ſeem naturally to ſuggeſt this idea to the mind. But I have many caſes upon record, which, in my view, ſerve to render this opinion indiſputable.

In September, 1798, I was called to a woman, upon an iſland, who had laboured under the prevailing fever for twelve days. I found that her moſt diſtreſſing complaint was pain and anguiſh in the bowels, for which ſhe had taken ſeveral cathartics, procured from an apothecary; and, although they operated powerfully, no permanent relief was obtained. I gave two grains of tartar emetic, and fifteen grains of ipecacuanha, which ejected a large quantity of dark green, and *remarkably* fœtid, matter from her ſtomach. The pain and diſtreſs then left her, and returned no more. Tonics and alkalines were then employed, and ſhe ſoon recovered.

I could mention many other caſes, in which great benefit was obtained from vomits, when cathartics had proved ineffectual. Theſe things being taken into conſideration, I have made it a general rule to direct an emetic, whether called in the beginning or declining ſtage of the fever, unleſs a ſpontaneous vomiting had ejected the offending matter.

The next ſtep was to evacuate the inteſtines with jalap and ſal. abſynth. The alkaline remedies were then employed according to the urgency of the caſe; obſerving always to keep the bowels in a ſoluble ſtate with caſtor oil and ſalts.

Experience has taught me, that alkaline ſalts and lime may be taken much more liberally than I have heretofore imagined. In many caſes of fever I have given twenty grains of ſal. abſynth, with thrice that quantity of calcined oyſter-ſhells, once in three or four hours, and made lime-water a common drink, with impunity, and evidently to very great advantage. Waſhing the ſkin of the patient with a ſolution of alkaline ſalts has likewiſe been practiſed, and apparently with good effects.

I have alſo directed quick-lime to be depoſited in the rooms of the ſick, which evidently purified the air.

I feel a perſuaſion that theſe articles poſſeſs a much greater

power in the cure of febrile diſeaſes than has formerly been imagined: and I believe that very great improvements will in future be made reſpecting the mode of application.

In the ſummer of 1798, the inhabitants of the town of Boſton very judiciouſly ſtrewed *quick-lime* over the materials undergoing putrid fermentation, with a view to arreſt and deſtroy the poiſonous exhalations; and may we not, with equal propriety, employ this, and other articles of a ſimilar nature, as remedies, when the human body is actually poiſoned with theſe noxious effluvia?

During the ſpring months of 1799, low, ſlow fevers were prevalent, attended with cough, and great expectoration of matter, often mixed with conſiderable quantity of blood, putting on all the appearance of what is called *hectic fever*. I attended twenty-three caſes of this ſpecies of fever, in which they frequently lingered for two or three months. They all recovered, excepting one, upon the tonic and alkaline plan.

From July to November general health prevailed. The ſummer ſeaſon was rainy and cool, accompanied with much thunder and lightning.

In the months of November and December, 1799, and in January and February, 1800, an inflammatory fever, attended with a ſore-throat, prevailed in ſeveral towns, among adults as well as children.

The diſeaſe was uſhered in with a pain and ſoreneſs of the throat, which ſoon ſwelled both externally and internally; redneſs of the fauces, and difficulty of ſwallowing, often with increaſed ſalival diſcharge; naufea and vomiting; increaſed heat over the whole body; redneſs of the face, with heavy and watery eyes; pulſe quick and full.

In four or five days the inflammatory action of the veſſels abated, and a livid appearance was diſcoverable in the fauces, which were generally much excoriated, diſcharging a coroſive, offenſive ſanies. A febrile diſturbance continued until the ninth or tenth day from the attack, when a recovery or fatal termination took place.

The diſtemper generally proved fatal where ſeaſonable aſſiſtance was not employed.

Vomiting and purging always afforded relief; and bloodletting, on the firſt or ſecond day, was evidently beneficial. Calomel, if it produced a ſalivation, ſeemed to be productive of good effects, by unloading the glands and abating the ſwelling; but it did not appear to correct the virulence of the humors or reduce the fever.

Bliſters upon the neck and arms produced a great diſcharge. The parts were very ſore, and often very highly inflamed. On this account they were not attended with ſuch good effects when applied to the throat. Roaſted onions, impregnated with oil, applied to the throat, abated the ſwelling and relieved the ſwallowing, when a bliſter to this part often aggravated the complaints, and, in ſome inſtances, produced a gangrenous affection.

With a view to ſubdue the febrile diſturbance, which I ſuppoſed was kept up by the virulence of the poiſonous cauſe, I made a liberal uſe of lime-water; as alſo a powder of ſal. abſynth, and calcined oyſter-ſhells; together with linſeed oil and flaxſeed tea, often repeated.

Theſe articles were certainly attended with ſalutary conſequences; for where they were ſeaſonably and duly employed, the virulence of the humors ſeemed evidently to be corrected, and the fever ſubſided. The bark and tonic bitters, with nouriſhing food, were then directed, and health was ſoon regained. In nearly one half of the highly inflammatory caſes the diſtemper proved fatal; and, I believe, generally for want of ſeaſonable aſſiſtance: for if depleting remedies were not employed on the firſt or ſecond day, there was but little hopes of a favourable termination; but when they were, and the other remedies were duly adminiſtered, the patient generally recovered.

ARTICLE X.

An ACCOUNT *of the* ORIGIN *and* CAUSE *of the* YELLOW FEVER, *as it appeared at Wilmington (State of Delaware), in the Autumn of* 1798: *Communicated in a Letter from Dr.* JOHN VAUGHAN *to Dr.* MILLER; *dated Wilmington, January* 4, 1800.

Dear Sir,

WITH the wiſh of adding my *mite* towards a ſolution of that conteſted problem, the origin of the yellow fever, I encloſe you ſome facts reſpecting its occurrence here, in the fall of 1798.

Our worthy friend Dr. Tilton has informed you, that "he takes it for granted the diſeaſe was imported here from Philadelphia." I candidly confeſs myſelf to have been an advocate for the ſame opinion; and as candidly acknowledge, that I believe we were miſtaken: and the following facts will enable an impartial public to decide the queſtion.

As I did not reſide here during the exiſtence of this fever, it may, perhaps, be ſaid, that I am not qualified to judge of its origin. On the other hand, it muſt be admitted, that men are ſeldom ſolicitous of collecting, much leſs of perverting, teſtimony againſt themſelves; that no man who regards his reputation, and the public good, would wilfully diſtort facts, to miſlead the unwary, and inculcate a falſe belief on a queſtion of ſo much importance as the preſent.

To elucidate the riſe and progreſs of the diſeaſe, I ſhall give you a ſketch of the ſituation of the town, and trace the diſeaſe minutely in its paſſage along the flats.

Wilmington is ſeated on a hill of 109 feet elevation above the level of the tide. The moſt compact part is on a ſouth-weſtern declivity. It is bounded weſt by Chriſtiana-Creek, a tide-water:—ſouth-ſouth-eaſt by the River Delaware, diſtant a mile and a half; the intermediate ſpace compoſed of flat ground, a conſiderable portion of which is marſh:—eaſt by Brandywine-Creek:—north by an extenſion of the Pennſylvanian highlands. The northern ſide is interſected by a ſmall *vale*, in which there are breweries, tan-yards, &c. &c. The weſtern ſide of Chriſtiana-Creek is bounded by an extenſive marſh, which had been continually inundated for a number of years, but drained in the ſpring of 1798. From the middle of July this marſh became extremely offenſive, as may naturally be ſuppoſed, from one hundred acres of mud, covered with dead fiſh and decaying vegetables, expoſed to the action of a vertical ſun.

This, in addition to ſome filthy docks, rendered the atmoſphere of Water-ſtreet ſo diſagreeable, that the inhabitants were obliged to cloſe their doors and windows at ſun-ſet.

Dr. Tilton obſerves (Med. Rep. vol. iii. p. 128), "it was very remarkable, that the diſeaſe was not communicated from the firſt perſon who died of it, and who came down (from Philadelphia) and ſickened in the land ſtage. But when the fever became epidemic, it took riſe at the water's edge, and infected all, or with few exceptions, gradually up to High-ſtreet. Above this the town is more thinly built, and the caſes were ſolitary as in the country." The fact certainly

was, that the inhabitants thought themſelves ſecure until the lower ſtreets were conſiderably infected. It ſoon became general, nay, almoſt univerſal, in the three lower ſquares, extending ſouth and ſouth-eaſt, round into the flats facing the Delaware, and north into the valley afore-mentioned, depopulating as it went. In this circuit of about four ſquares upwards of two hundred perſons died: whereas the remainder and higher parts of the town were almoſt entirely exempt, though by no means equally deſerted.

An intelligent gentleman, who reſided here during the fall of 1798, informed me, that he, on riſing early one morning, was ſurprized at the appearance of a cloud coming from the marſh on the lower parts of the town. Struck with this phenomenon, he aroſe the next morning at day-break, and obſerved a very thick fog on the ſurface of the marſh, of about four feet in height, totally obſcuring the bodies of the trees in the marſh, while their tops were not affected.

As the ſun roſe, the fog roſe alſo, leaving the ſurface of the marſh perfectly viſible; and, paſſing gradually over the creek, ſettled on the lower part of the town, and ramifying round into the ſouth-eaſtern flats and northern vale beforementioned, till the heat of the ſun entirely evaporated it. He repeated his obſervations frequently, and always obſerved the ſame phenomena. Others have informed me, that the atmoſphere of the diſeaſed circuit was not only offenſive to the ſenſe of ſmelling, but extremely oppreſſive; that the air appeared to have loſt its elaſticity altogether.

Theſe facts are equally true and important, and tend to reflect much light on the origin of our yellow fever; notwithſtanding the foreign origin of the diſeaſe was ſo generally admitted.

There was one caſe here laſt ſeaſon, in a lady from Philadelphia, who had buried ſome of her family before her emigration. She died; and, though nurſed without reſtraint, did not infect her attendants.

"The nurſes and attendants at the hoſpital here, in 1798, all eſcaped infection," becauſe they were removed from the ſphere of miaſma.

Several ſporadic caſes happened in this neighbourhood laſt fall, but no inſtance of communication: and while we keep our marſh dry, or inundated, I believe we have little to fear.

It is worthy of remark, that while the diſeaſe raged ſo violently in this town, the inhabitants of the oppoſite ſide

of the marſh were not affected. The wind blows almoſt conſtantly from the ſouth-weſt, wafting the miaſma over to the leſs fortunate Wilmingtonians.

In reviewing this ſhort account, three queſtions naturally ariſe in the mind of every unprejudiced man.

1ſt. If the yellow fever be of foreign origin, and contagious, why did it not ſpread here, in the ſummers of 1793 and 1797, when the Philadelphians were admitted, nurſed and buried without reſtraint? Not a ſingle inſtance of communication happened.

2dly. If the remote cauſe of yellow fever be contagious, why does it not, like the ſmall-pox and meaſles, communicate, under all circumſtances, without the aid of marſh effluvia? It will ſcarcely be denominated leſs virulent, if we admit a proportion between cauſes and effects.

3dly. If the diſeaſe was produced by the effluvia of the weſt marſh, it muſt have been, at this time, more ponderous than uſual, by its grovelling on the flats and up the vallies, and not ſoaring on to the hills, as in ordinary caſes? (Vide Med. Rep. vol. iii. p. 223).

To the preceding ſummary may be added an account of the occurrence of the fever in Chriſtiana village, and its neighbourhood, at the ſame ſeaſon, which I ſhall venture to pronounce an *indigenous diſeaſe*. I ſhall not, at preſent, give a minute detail of the diſeaſe, but reſerve it for an article in the hiſtory of the diſeaſes of Delaware. It may ſuffice to ſay, that the ſymptomata were complete.

The firſt caſe that occurred was in the Welſh-Tract ſwamps —attended with naſal hæmorrhage, petechiæ, &c.

The ſecond was adjacent to an extenſive marſh—attended with the black vomit—delirium continuing without fever, &c. Three perſons died out of this houſe in ſucceſſion; and, notwithſtanding I was ſuſpicious of contagion, and made every effort to eſtabliſh it, no pretext could be found; and the occurrence of the diſeaſe in various other parts of the adjacent country, ſoon convinced me that it was an *indigenous* product.

In September the diſeaſe was general, and truly alarming. It alſo preſented itſelf in Newcaſtle, but was there referred to contagion.

I viſited ſeveral perſons there; and, having renounced the idea of contagion, endeavoured to quiet the fears of the attendants. It alſo extended down, along the river ſhore, for ſome diſtance.

Generally ſpeaking, the diſeaſe was rather more mild than in Wilmington and Philadelphia, but frequently equally malignant and fatal.

A number of emigrants from Philadelphia and Wilmington were attacked with the diſeaſe; perhaps brought the ſeeds of it with them; and, though nurſed with all the attention that affection and humanity could afford, there was not a ſingle ſuſpicion of communication.

This haſty ſketch will ſerve, I hope, to ſhew the difference between implicit aſſent and inveſtigation. To the *former* I have confeſſed myſelf a victim; to the *latter* I avow myſelf a convert; believing that a man deſerves more credit for acknowledging than perſiſting in an error, particularly when the welfare of ſociety is, in ſome meaſure, involved in his opinion. It is moſt devoutly to be wiſhed, that the real origin of this deadly diſeaſe could be agreed on by the faculty. We ſhould then join hands in purſuit of one object; the community would aid us; and ſome hope might be entertained of exemption, ſooner or later, from its devaſtation. At preſent the proſpect is gloomy.

With the utmoſt ſolicitude for the ſucceſs of your uſeful work,

I remain yours ſincerely,

JOHN VAUGHAN.

REVIEW.

ART. I. *A Treatiſe on the Plague and Yellow Fever; with an Appendix, containing Hiſtories of the Plague at Athens, &c. By* James Tytler, *Compiler of the Medical Part of the Encyclopædia Britannica. Salem. Printed by* J. Cuſhing, *for* B. B. Macanulty. 8vo. pp. 568. 1799.

SINCE the American cities began to be viſited by peſtilential diſtempers, a large number of publications concerning them have iſſued from the preſs. Not a few of theſe have been noticed in the progreſs of our review. Of thoſe which we have not mentioned, ſome were publiſhed before the Medical Repoſitory was begun; ſome which we have heard of we have not been able to procure; and others remain on hand, to be taken up in their turn. Were authors diſpoſed to favour and accelerate our labours, by ſending us copies of their books and pamphlets, it would oftentimes be in our power more ſeaſonably to ſubmit our abſtract or opinion of them to the people of the United States. As we are circumſtanced at preſent, the ſmallneſs of literary intercourſe, between many parts of the weſtern continent, renders it more difficult to procure ſome of our domeſtic productions than thoſe of Great-Britain. And, odd as it may appear, it has ſeveral times happened, that American performances have firſt become known to us through the medium of Hamburgh and London.

Though we had heard of the publication of Mr. Tytler's volume, yet ſeveral months elapſed before it travelled from Salem to New-York. Since it came into our hands we have looked over its pages, and ſhall now give ſome account of their contents.

The writer, we are informed, is an emigrant from Scotland, and has been accuſtomed to hiſtorical and literary compoſitions. We are, indeed, at this time, plainly told that the medical part of the Britiſh Encyclopædia was prepared by his hand. From the habit of writing he may be ſuppoſed to have acquired, and from his familiar acquaintance with medical ſubjects, it is not at all to be wondered at, that ſuch a member of the literary corps of Europe ſhould take up his pen,

and join the people of the atlantic coaſt in their reſearches into the origin and nature of endemic and peſtilential diſeaſes. We have not, however, learned from Mr. T.'s book, or otherwiſe, that he has been *perſonally converſant* with plagues and peſtilence, during their prevalence; nor that he is entitled to the character of an *original* obſerver of events and occurrences, in ſuch times of public commotion.

On the other hand, Mr. T. appears before us as a compiler. Though a writer ſhould not offer to his reader any *new* facts, he may ſtill preſent him a work inſtructive by its matter, and valuable for its arrangement. Hiſtorians are compilers; and their works are chiefly prized for the materials they collect, and the ſkill with which they methodize them. He who carefully gathers together the parcels of any department of knowledge into a *body*, is commendably employed. Yet the materials of every copious ſubject require to be *digeſted*. A *ſummary* of the leading doctrines and opinions, on queſtions of general concern, may be eminently ſerviceable. How excellent a *compendium* of geometry has been furniſhed by Euclid! What a noble *epitome* of chemiſtry was made out by Lavoiſier!

The writer divides his work into two parts; and treats, in the former, on what he calls the Aſiatic, or true plague; and, in the latter, on the yellow fever, a diſeaſe of a deadly nature in the weſtern world. Having obſerved that the two have been confounded in deſcription, and that attempts have been made, of late, to prove them but gradations of the ſame malady, Mr. T. makes it a principal object of his inquiry to ſhew that this is a miſtake, and that there is a real and eſſential difference between them.

After devoting three hundred and ſeventy pages to an inveſtigation of the origin, progreſs, ſymptoms, prevention and cure of the genuine or Oriental plague, our readers will be diſappointed, and, we fear, mortified, at the inferences which Mr. T. draws from the hiſtorical records which he has examined. They are ſo remarkable that we ſhall deliver them in his own words:

"I now conclude this part with a ſhort retroſpect of the principal facts which, to me, ſeem to be the reſult of the inveſtigation. 1. That the plague is of an unknown (I believe it of *divine)* original. 2. That in the countries on which it firſt was ſent it ſtill remains, and from them has always been propagated to others, without a ſingle well atteſted inſtance to the contrary. 3. That the means by which

the diſtemper uſually has been propagated are *war* and *commerce*. 4. That the diſeaſe differs from all others, in having a more violent tendency to inflammation, inſomuch that it approaches to actual accenſion; nay, that the extraordinary inſtances of ſpontaneous burning we read of are to be accounted only the higheſt degree of this diſeaſe. 5. That the immediate or proximate cauſe of the plague is a tendency in the blood, and other fluids, to diſcharge upon certain parts the latent heat they contain, in ſuch quantity as to deſtroy theſe parts entirely, and to convert them into a kind of coaly ſubſtance. 6. That this tendency depends on a certain inexplicable action of the external atmoſphere, particularly of the elementary fire contained in it, and of which it principally conſiſts.* 7. The approach of a plague cannot be foretold, either from the conſtitution of the atmoſphere, earthquakes, ſtorms, or any other natural phenomena. 8. The plague is an eruptive diſeaſe, and it is known to be ſo by the *certain death* of all in whom eruptions do not appear; a tendency to eruption being *always* obſerved where life remained long enough. 9. The contagion of the plague diffuſes itſelf from a ſmall ſpace all around, leſſening in violence the farther it is diffuſed. In its moſt concentrated ſtate it hath proved invincible by medicine; in its mild ſtate it requires none;† ſo that, in the plague, the medical powers are found of leſs avail than in any other acute diſtemper. 10. The natural cure of the plague is by perſpiration or ſweat; and this, perhaps, is the only evacuation which ought to be kept in view, as having a ſalutary tendency, by thoſe who attend the ſick."‡

In this we do not complain that there is nothing to flatter human vanity; but, alas! we grieve that there is ſo little to aid or comfort human weakneſs.

Mr. T. in p. 47, goes a little further into particulars. After a ſtatement of various facts relative to the Jews, Tyrians, Carthaginians, Greeks, Turks, and others, he adds: "In this way we may, in a pretty plauſible manner, account for the origin of this diſtemper; viz. that it originally fell upon the Jews as a puniſhment for their iniquities; that from the Jews it has been, at different times, conveyed to other nations;

* "Theſe two laſt concluſions (though I believe them myſelf) are propoſed only as probable conjectures, which, as yet, I ſee nothing to contradict.

† "See p. 282.

‡ "The operation of oil, ſo much recommended by Mr. Baldwin, is ſaid to be by producing ſweat. (See above, p. 341.")

and, by a mixture of thoſe nations, has at times become general all over the world. At laſt it has, by the avarice of that people who firſt had been the occaſion of its being introduced into the world, become permanent in Conſtantinople, whence it is ſtill diffuſed among different nations, in proportion to their dealings with that capital." And in p. 71: "At preſent we may conclude, that the peſtilential contagion having originally fallen upon mankind for their ſins, it is ſtill kept alive by the ſame cauſes; and, as far as we can conjecture, theſe ſins are, the propenſity to murder and deſtroy, which breaks forth in war; the vanity, pride and luxury which produces great cities; and the ſame vanity, &c. joined with avarice, which gives life to commerce."

We fully agree with the writer, that the plague, and, we add, all the other phenomena of this world, and of the univerſe, are to be reſolved ultimately into the power and agency of the Supreme Ruler, or *Primary* Cauſe. It ſeems to us alſo, that in accompliſhing *ends* he makes uſe of *means*; and theſe means, in the caſe before us, are what are termed *ſecondary* cauſes. The modeſty of ſcience has given up the inveſtigation of the firſt cauſe as beyond its comprehenſion. The true buſineſs of philoſophy is the tracing of ſecondary and ſubordinate cauſes to their effects, and, *vice verſa*, of effects or events to their cauſes, as far as our capacities extend. Generally ſpeaking, it is neither inſtructive nor neceſſary to overlook the whole catenation of intervening cauſes, and refer every thing at once, *en maſſe*, to the immediate will, or direct operation, of the CAUSA CAUSARUM.

> "Nec Deus interſit, niſi dignus vindice nodus
> "Inciderit"——

Is a good maxim in philoſophy as well as in poetry.—Now, we are ſatisfied that the production of peſtilential matter from the elements which compoſe it, is a proceſs of no greater myſtery nor complication than happens, every day, in a thouſand other caſes: and Mr. T. ought, as much as in the preſent inſtance, to aſcribe the production of the ſeeds of plants, and the eggs and germs of animals, with their evolution and growth afterwards, to an immediate act of Deity. And, in the ſame brief and conciſe manner, he might account for the diſtribution of ſunſhine, and rain, and for the winds, tides and ſeaſons in the planet we dwell upon—*Omnia Jove plena.* But we ſhould not dignify this with the name either of philoſophy, ſcience, or even of hiſtory.

The faſhionable doctrine has been to derive the contagion

of plague from one perſon or thing to another, in legitimate ſucceſſion, from the *ancient*, and, as Mr. T. believes, its *divine* ſource. From the Jews, for inſtance, to the Phenicians; from theſe to the Carthaginians; from theſe again to the Sicilians, &c. in one channel: then from the Jews again to the Romans, and the nations with whom that people had intercourſe, in another: then again from the Jews to the Egyptians, the Saracens, the Greeks, the Turks, &c. in other currents: and from the ſame Jewiſh manufactory to make it ſpread, with the cruſaders, all over the weſtern parts of Europe. Thus all manner of miſchief ſallied forth from Pandora's box; and one of theſe fables is about as worthy of credit as the other. The favourers of this derivation of contagion frequently expreſs themſelves about it by ſparks, or other metaphors derived from fire. We recommend to them another parallel, which they ſeem not to have thought of; which is, to derive *fire* itſelf, as well as the *plague*, from the *Hebrews*; and this could be done with perfect eaſe, by affirming, that from the original and true Jewiſh fire did the Tyrians and their coloniſts, the Egyptians, the Greeks, the cruſaders, and every body elſe, derive the firſt ſparks, which are ſtill preying upon the dry wood, and all things elſe prediſpoſed to be acted upon by them over the whole earth. This analogy of *fire* would, we think, throw much *light* on the ſubject.

But to be ſerious—As the *moral* conduct of man is conſidered inſtrumental in ſtirring up plagues, this, we conceive, may happen through a neglect of cleanlineſs, or by ſuffering peſtilential filth to form and accumulate in and around their perſons and habitations. We conſider it a part of the moral law, to be clean and free from defilement. The breach of this law is a vice or evil, for which the offender muſt expect ſome kind and degree of puniſhment. It often happens that the puniſhment for tranſgreſſions of the moral law follow ſpeedily the offence, and the ſinner, before entering upon the life to come, ſuffers the penalty he has incurred in this world. Noxious or peſtilential vapours are the natural offspring of perſpired and excreted ſubſtances undergoing corruption, and added to the incalculable maſs of animal matter afforded by the bodies of beaſts, birds, fiſhes, and other creatures killed for the purpoſes of food and manufacture, and collected into cities by the induſtry of man. When, from a long-continued and exceſſive accumulation of ſuch materials, and a neglect of the means of preſerving public as well as private cleanli-

neſs, ſickneſs ariſes, it may be properly enough conſidered a viſitation upon the inhabitants of a town or place, for their contempt of a high moral obligation. If war, commerce, and hot ſeaſons, tend to augment the cauſes, then peſtilential diſtempers may be expected to follow of courſe.—So far may men be conſidered as bringing down judgments upon their own heads: and theſe judgments may be generally mitigated, and ſometimes wholly averted, by due and ſeaſonable uſe of oils, calcareous earths, alkaline ſalts, ſoap and water, as both ancient and modern experience evinces.

The firſt part of Mr. T.'s work is divided into five ſections; of which the firſt treats of the etymology of *plague*, its antiquity, and an account of ſeveral plagues deſcribed in the Hebrew ſcriptures, and in profane hiſtory. The ſecond inquires into the countries where it is ſuppoſed to originate—the influence of climate in producing diſeaſes—and the moral conduct of the human race as operating in a ſimilar manner. The third, which comprehends two hundred and twenty-eight pages, contains a large portion of phyſiology, or of principles of the practice of phyſic, as well as an ample diſplay of chemical knowledge, forming a long and wide digreſſion from the plague. He, however, returns, at length, to its medical hiſtory, and apologizes, toward the end of the ſection, for having ſeemingly ſtrayed from the ſubject. The fourth comprizes the means of prevention, collected from Mead, A. and P. Ruſſel, Howard and others, and conſiſting of ſhutting up houſes, quarantines, and the like regulations; and a detail of ſome preventative methods attempted in the Britiſh navy, at Smyrna, &c. concluding with a recommendation of guarding againſt it in the ſame way we provide againſt ſmall-pox, by *inoculation*. In the fifth, the cure is conſidered; and the phyſicians whom he deems beſt acquainted with it, are the Ruſſels of Aleppo, and the phyſicians of the Ruſſian army. Then, after mentioning the ſentiments of Sydenham, Hodges, de Mertens, and Diemerbroeck, he concludes this part of his treatiſe with the general inferences before quoted.

Our readers will, before they have proceeded thus far, have been convinced, that Mr. T. is a moſt rigid adherent to the *old notions of contagion*, &c. in phyſic. It only remains to inform them, that he is vehemently oppoſed to the new Nomenclature, and its conſequences in chemiſtry, declaring that Lavoiſier (as if it was ſolely his work), by changing *entirely* the language of former chemiſts (a number of the former

terms ſtill remain), and ſubſtituting a ſet of new terms of his own invention, "certainly has entailed the greateſt curſe upon the ſcience it ever met with." In which opinion, as well as in a multitude of others contained in this piece, we believe Mr. T. to be totally miſtaken.

(To be continued.)

ART. II. *The Doctrine of Phlogiſton eſtabliſhed, and that of the Compoſition of Water refuted. By* Joſeph Prieſtley, *LL. D. F. R. S. &c. &c. Northumberland.* Kennedy. 8vo. pp. 90. 1800.

FREQUENTLY, in the courſe of our work, we have had occaſion to mention the phlogiſtic controverſy, which, though carried on with much zeal, labour and talents, has not yet exhauſted the ſtrength of the parties. Our readers, we hope, will participate the pleaſure we feel on taking a retroſpect of our pages, and finding the United States the theatre of ſo much ſcientific diſquiſition. Our Repoſitory contains the ſeries of theſe events, from the time that Dr. Prieſtley's Conſiderations, &c. part i. (ſee vol. i. p. 221) were publiſhed, to the anſwer of Mr. Adet (ibid. p. 225), the examination by Profeſſor Maclean (ibid. p. 348), and a plan of accommodating the diſpute, propoſed by Mr. Mitchill (ibid. p. 514). It alſo contains an account of Dr. Prieſtley's Obſervations, &c. part ii. (ibid. p. 541), and the eight letters, at large, which he addreſſed to Mr. Mitchill on the points of difference (ſee vol. i. p. 521. vol. ii. p. 48, 163, 166, 263, 269, 383, 388). Much of the wide range of diſcuſſion herein embraced is new and original.

It is very remarkable, that a man who gives the greater part of his time to *theological* ſtudies, can accompliſh ſo much in *phyſics* as Dr. Prieſtley does. But an induſtrious employment of one's ſelf, and a methodical diſpoſition of buſineſs, will accompliſh wonders. In the preſent publication, this indefatigable explorer of the arcana of nature has ſummed up the arguments in favour of phlogiſton in a conciſe manner, and exhibited them, in one group, to the view. In doing this he facilitates inquiry, and puts it in the power of the ſtudent to underſtand the *merits* of the queſtion, without a tedious and formal preliminary.

It is known to thoſe who have peruſed the new Nomen-

clature, propoſed by the philoſophers of Paris, in 1787, that ſeveral claſſes of natural phenomena, which had been conjectured to be effected by the mediation of extremely ſubtil, though active fluids, are left out of the enumeration, unexplained, and not accounted for. The doubtfulneſs of the exiſtence of ſuch ſubſtances as the ſuppoſed *magnetic* and *electrical* fluids, prevented their inſertion, as diſtinct and material beings, in the catalogue of elements or ſimple bodies. The former was rather believed to be a modification of iron, and the latter but a condition of the igneous fluid. In like manner it appeared to the contrivers of that project for a philoſophical language, that the phenomena of inflammation or combuſtion no more required a *phlogiſton* to explain them, than the corruſcations of lightning, and the polarity of the needle, ſtood in need of their peculiar eſſences.

How far theſe reformers were warranted in their proceedings is not yet completely ſettled. In ſpite of their neglect and ſilence, magnetiſm and electricity are generally talked of as connected with the movements of peculiar fluids; but as the proof of their exiſtence is neither very ſtrong nor pointed, no warm conteſt has been raiſed concerning them.

It has been otherwiſe with phlogiſton. From the time that *Beecher* began to obſerve the proceſs of combuſtion with a philoſophical eye, and *Stahl* to generalize the phenomena, it had ſeemed to them, and to moſt of thoſe who had witneſſed their experiments, and conſidered their interpretation of them, that combuſtible bodies contained *a principle of inflammability*, and that this was very aptly denominated "phlogiſton." Neither they nor their followers, however, had diſentangled the intricacies of combuſtion, ſo far as to let it be underſtood which of the various elementary particles, entering into the complicated ſtructure of an inflammable ſubſtance, was κατ' ἐξοχήν, the true inflammable material. Though, in the main, they were right, yet they expreſſed themſelves with ſo much uncertainty, and ſo little preciſion, when they came to particulars, and treated of the matter in detail, that they not only differed from each other, but ſcarcely any one was conſiſtent with himſelf. Some thought it a ſubtil and indefinable ſubſtance, differing from every other. Some imagined the phlogiſton a *ſulphur*; others that it was *charcoal*; and, latterly, others that the *baſis of inflammable air* was the thing. In this ſtate of indiſtinctneſs and doubt, it is not to be wondered at, that in the zeal of revolutionary enterprize, phlogiſton ſhould be excluded from a Nomenclature of Science: and in

this the reformers acted wisely, until its advocates would agree upon an explanation or definition, and declare explicitly what it was that they meant.

Bodies that will burn appear to us distinguishable into two kinds; to wit, 1. Those which burn *with flame* or *blaze*; and, 2. Such as burn *without*. Flame, as far as we know and believe, is universally caused by the burning of a gaseous fluid, furnished by the consuming body, and, from its inflammability, termed inflammable air. And as caloric and light are copiously evolved during the union of its basis with the basis of oxygenous air, it comes to pass that the phenomenon of *blaze* is produced, which *Newton* called an "ignited vapour." Kirwan had proceeded in this investigation so far as to declare, that inflammable air, or its radical, was phlogiston; and happy would it have been for the science, if that discerning philosopher had adhered to his definition, and combated the introduction of such a word as "hydrogen" into the Nomenclature. Such bodies, then, as sulphur, oil, alcohol, wood, phosphorus, iron, zinc, ether, camphor, and others, burn with blaze or flame because they contain phlogiston, or the basis of inflammable air. On the other hand, pure *carbon*, and other (if there are any other) simple combustible bases, burns without any flame at all, as in punk, agaric, tinder, and sundry substances which consist almost entirely of *carbonic*, without any admixture of *phlogistic* matter.

With these considerations, we proceed to the examination of the pamphlet before us. On turning over its pages, we cannot forbear to admire the confidence with which the author expresses the establishment of the phlogistic doctrine, and the refutation of the compound nature of water. The piece is particularly addressed to the French chemists who answered Mr. Kirwan (and converted him), or to the survivors of them. The matter in it is arranged under eleven heads, or sections, to which is subjoined an appendix of four articles.

The principal points contended for are the following: 1. That metals are compound substances, and contain phlogiston. 2. That finery cinder is not a proper oxyd of iron, but a combination of water with iron. 3. That the inflammable air produced from finery cinder and charcoal heated together, is formed by the union of the water of the finery cinder with a portion of the charcoal, while the other part of this substance furnishes phlogiston to revive the metal. 4. That the flowers of zinc contain no oxygen; though during their pre-

paration, when ſteam was made to paſs over the metal in an ignited ſtate, inflammable air was produced. 5. That ſulphur is formed by heating vitriolic acid in inflammable air, and by expoſing water, impregnated with vitriolic acid air, to a continued heat. 6. That as calces of mercury are reducible in inflammable air, which is abſorbed during the proceſs, and that metal reduced thereby, it muſt contain phlogiſton; and when calces of quick-ſilver are reduced without addition, the phlogiſton neceſſary for conſtituting the metal muſt paſs through the red-hot glaſs from without. 7. That the antiphlogiſtian experiment of the decompoſition of water, by cauſing ſteam to paſs over red-hot iron, is utterly inconcluſive; and that when an electric ſpark is paſſed through a mixture of oxygenous and inflammable airs, not *water*, but *nitrous acid*, is inſtantly produced. 8. That the proportions of the elements of which water is ſuppoſed to conſiſt (fifteen of hydrogen, and eighty-five of oxygen), do not accord with the reſults of experiments. 9. That the production of dephlogiſticated and inflammable airs, by taking electric exploſions and water, by Trooſtwyck, Deimann and Pearſon, is the reſult of a very complex experiment; and, of courſe, the interpretation of it, to evince the ſolution of water into thoſe airs, very dubious; and that Mrs. Fulhame's interpretation of her experiments is fanciful and fabulous. 10. That fixed air is formed without the preſence of carbon, and conſiſts of dephlogiſticated air and phlogiſton. And, 11. That phlogiſticated air is compoſed of dephlogiſticated and inflammable airs.

In giving this ſummary of the publication, we have endeavoured fairly to ſtate the meaning of the author. The learned reader will inſtantly diſcern how widely he differs from the greater part of the moſt famous and elaborate experimenters of the preſent day. In a number of inſtances, he invalidates their experiments by counter-experiments, which lead to conſequences oppoſite to theirs. Where the contending parties are thus at iſſue upon matters of fact, it is not in our power, nor does it belong to our province, to pronounce which is right. It is a pity that the makers of experiments on both ſides, who are, doubtleſs, equally deſirous of diſcovering truth, cannot be perſonally witneſſes and aſſiſtants of each other's proceſſes, and thus determine where the error lurketh.

Conſidering this as the ableſt piece we have ſeen in defence of the phlogiſtic doctrine, we feel inclined to be the more particular in our remarks upon it. And we muſt acknow-

ledge, after all the pains we have taken to interpret the facts, and underſtand the reaſoning contained in it, that we have many doubts yet unſatisfied. Phlogiſton, as treated of by our author, does not yet appear that well-defined and diſtinct ſubſtance which the apparatus of a laboratory can exhibit, and the mind preciſely comprehend; but is veiled or diſguiſed under ſo many diſſimilar forms of being, and diſcordant modes of expreſſion, that we hardly know what to think of it. Now he offers it to us in the guiſe of "the baſe of inflammable air," or *hydrogen* (p. 26); then as "the baſis of phlogiſticated air," or *azote* (p. 27); and, again, as a conſtituent material of "fixed air," or *carbon* (p. 61). This does not content us: it ſeems *miſcere quadrata rotundis*. We think we have as ſatisfactory proof that theſe three forms of matter, which Dr. Prieſtley affirms to be but three forms of phlogiſton, as diſtinct elements or exiſtences, as we have of the different natures of pot-aſh, ſoda and ammoniac, or of lime, barytes and magneſia.

Thinking on theſe ſubjects as we do, it ſeems very extraordinary that the diverſified phenomena afforded by theſe *three* bodies, can, with any degree of propriety or correctneſs, be referred to phlogiſton, unleſs phlogiſton is an accommodating term, or convenient expreſſion, to ſuit the purpoſes, be they what they may, of the perſon who uſes it. Where it is thus employed, it renders our reaſoning uncertain and obſcure, and tends to embarraſs, rather than diſentangle the ſubject.

The Providence which imparted to the atoms which compoſe this world their reſpective properties, enabled them, indeed, to combine into an endleſs variety of forms, and thereby conduce to the novelty, the beauty and utility of the ſyſtem. But the ſame wiſe and ordaining power ſeems to have prohibited the change of one element into another, and to have forbidden each claſs of ultimate particles to transfer their peculiar qualities or energies to another. We are convinced, that what are termed *hydrogen*, *carbon* and *azote*, are ſubſtances; that they are very unlike each other in many reſpects; and that they are not convertible each into the other, nor into a common matter, phlogiſton. If we were convinced ſuch convertibility was poſſible or frequent among theſe baſes of gaſes, we ſhould, by parity of reaſoning and by analogy of caſes, agree to the exploded doctrine of the tranſmutation of metals, and of the convertibility of tin, antimony and quick-ſilver, to gold.

As reviewers, our ſituation may be compared to that of

jurors, to whom oppoſite and contradictory teſtimony is ſubmitted. We muſt examine the weight of evidence, ſcrutinize the ambiguities of language and expreſſion in the witneſſes, inveſtigate the involuntary bias and propenſities of each, and, by juſt rules of interpretation, endeavour, to the beſt of our judgment, to reconcile the claſhing declarations to each other, and to truth. And thus our verdict, if not flattering, will, at leaſt, be allowed to be honeſt and candid. —We cannot diſcern that azotic air contains phlogiſton, and we therefore are of opinion it is very improperly called "phlogiſticated." The employment of this term to expreſs that portion of the atmoſphere, needleſſly incumbers it with the ſhackles of hypotheſis. We are equally incapable of perceiving wherefore oxygenous gas, which avowedly contains none at all, ſhould be expreſſed by the term "dephlogiſticated," which unavoidably and uſeleſſly brings the ſame ſuppoſed or imaginary agent to the mind. It would be better to diſcontinue the uſe of them both; ſince ſuch is the aſſociation between the words we employ as the ſigns of things, and the things ſignified by them, that, with inappropriate or badly-ſelected terms, it is almoſt impoſſible either to conceive or to expreſs a ſubject clearly. Indeed, if the word "phlogiſticate" means, *to charge or impregnate with phlogiſton*, then its derivative, "phlogiſticated," uſed as an adjective to air, or any thing elſe, can only intend to ſignify that ſuch body is aſſociated to, or ſaturated with, phlogiſton. Now, if there are facts to ſhew, that what is called azotic air is either itſelf phlogiſton, or, during the common combuſtion of fuel or calcination of metals, receives phlogiſton, we acknowledge we either do not know them or do not underſtand them. The very terms are grounded upon a *petitio principii*. They, of courſe, muſt influence the conceptions, and tincture the reaſonings, of all who uſe them. We do not ourſelves employ them as the medium of thought. But we predict that the controverſy between Dr. Prieſtley and his opponents, will never be ſettled while he continues his preſent phraſeology, and they adhere to theirs. The diſpute is chiefly verbal, and inheres leſs in the ſubject than in the manner of expreſſing themſelves about it. Dr. P. declines adopting the new Nomenclature, becauſe its principles are not ſufficiently aſcertained (p. 78). The part of the old terminology to which he adheres, appears to us quite as liable to objection, on that very account, as the moſt exceptionable part of the new.

Nor is the old term, "fixed air," for *carbonic acid*, in any

degree more appropriate. Is this the only *air* capable of being *fixed?* or is it, in its aërial form, fixed at all? Yet, though we wonder at the phraſe ſtill retained to expreſs it, we marvel more that this compound, whoſe conſtitution has been proved, over and again, both ſynthetically and analytically, ſhould be declared to be but a different combination of the ſame elements which form his phlogiſticated gas (p. 72). While this form of expreſſion is retained, it will not be eaſy to think or write with much exactneſs about it.

Inflammable air, ſays Dr. P. is made by the *union of charcoal with water* (p. 18, in the experiment of treating finery cinder with charcoal); and he ſpeaks *of all the phlogiſton in the charcoal* (p. 21) *as capable of being converted, by that proceſs, into inflammable air.* From inflammable air, he ſays, phlogiſticated air may be generated (p. 67 and 74). And he further declares, that charcoal is reſolvable, by means of water, into *fixed* and *inflammable* air, and that fixed air conſiſts of dephlogiſticated air and phlogiſton (p. 58). Now, by p. 26, phlogiſton is the baſis of inflammable air; and, by p. 67 and 75, it gives origin to phlogiſticated (azotic) air. The inference from all which is, that in Dr. P.'s eſtimation, the three ſubſtances called *carbonic acid*, *hydrogenous gas*, and *azotic air*, are but modifications of the *ſame thing*, and that thing is *phlogiſton*. This ſtrikes us like making *quidlibet e quolibet*. We cannot, though we ſtrive to be impartial, conceive this expoſition likely to enlighten thoſe who are beginning to learn, or to convince ſuch as are already inſtructed.

Such being the avowal of Dr. P. concerning the conſtitution of theſe three kinds of air, it is not wonderful that, in relating his experiments, he ſhould differ exceedingly from other philoſophers. When he uſes the terms *inflammable*, *fixed*, and *phlogiſticated* air, if we underſtand rightly, he means but different modifications of phlogiſton; while moſt, if not all other perſons who employ the ſame phraſes, or their ſynonymes, intend to expreſs various modifications of hydrogen, carbon and azote. We have reaſon to believe the experienced and reſpectable author is one of the moſt correct experimenters. We have a high opinion of his ingenuouſneſs and candour; but we, at the ſame time, are conſtrained to ſuſpect his peculiar habits of thinking and methods of communicating his ideas, bedim the ſplendour, and diminiſh the value, of his phyſical reſearches.

After theſe reflections on what appear to us the radical and

inſuperable difficulties of Dr. P.'s doctrine, we decline entering into a minute examination of his experiments, as few of his recitals of them are free from the *triune* myſtery of phlogiſton, which exceeds the utmoſt ſtretch of our faith; for, according to it, *carbon is phlogiſton*, and *hydrogen is phlogiſton*, and *azote is phlogiſton*; and yet there are not *three* phlogiſtons, but *one* phlogiſton! &c.

We ſhould be willing to meet Dr. Prieſtley midway, and accommodate the controverſy, by defining phlogiſton to be the baſis of inflammable air and of flame, and limiting its meaning to what has latterly been underſtood by *hydrogen*. This propoſal, which nearly accords with Mr. Kirwan's ideas, has already been made, and has, by him, been rejected (See Med. Repoſ. vol. i. p. 521). He repeats his objections, in No. 1 of the appendix of the work now before us (p. 79), to Dr. Mitchill's attempt to reconcile the two ſyſtems. We can think of no other plan that is plauſible.—The other papers of the appendix contain the claims of the author to the diſcovery of oxygenous air, in explanation of the pretenſions of Ingenhouſz and Lavoiſier, and ſome obſervations on H. Davy's Eſſays.

ART. III. *Tranſactions of the Society, inſtituted in the State of New-York, for the Promotion of Agriculture, Arts and Manufactures, Part* iv. *Albany.* L. Andrews. 4to. pp. 178. 1799.

PART the third of the Tranſactions of this Society, was reviewed in our ſecond volume, p. 315 et ſeq. and already we find another collection of their papers laid before the public.

The ſubjects of the pieces in this volume are various, and are moſtly of an uſeful or practical tendency. They amount, in the whole, to near thirty articles. Among theſe, the communications of the Preſident, Mr. Chancellor Livingſton, make a diſtinguiſhed figure. It is very honourable to himſelf, as well as reputable and advantageous to the country, that a gentleman of Mr. L.'s fortune and ſtation in ſociety devotes a conſiderable portion of the time he can ſpare, from private and public engagements, to the improvement of the uſeful arts. In thoſe intervals, when neither the ſuits in Chancery, nor the Council of Reviſion, nor the Court for the Trial of

Impeachments and the Correction of Errors, require his attention, we find this uſeful citizen engaged in ſome experiment or obſervation in rural affairs, or project in mechanics or economics. The volume before us contains ample proof of the induſtry with which he has laboured. His papers are the following: 1. Experiments to ſhew the advantage of cultivating the vetch (vicia ſativa vulgaris) as a ſummer fallowing crop (p. 21), from ſeed imported, for the firſt time, from England. 2. Thoughts on lime and gypſum (p. 60), tending to explain the manner in which theſe modifications of calcareous earth operate in ſoils. 3. An account of Humboldt's experiments, in the *Journal de Phyſique* for 1798, for accelerating the germination of ſeeds, by means of oxygenated muriatic acid. 4. On the advantages of domeſticating the elk and mooſe of America, and breaking them to the harneſs and draught. Our readers will be pleaſed to learn, that Mr. L. has actually attempted the taming of the elk.

"No attempts," ſays he, "have been made to render theſe noble animals uſeful. Content with ſacrificing them to our hunger, we have never thought of drawing, from their activity and ſtrength, the aids which they might afford us by their labour. The elk is larger than the rein-deer, and, when taken young, as domeſtic as the ox, as I find from having three that run with my cattle, and appear as much attached to them as of their own ſpecies. I have lately attempted to break two of them to the harneſs, and am much encouraged by my firſt eſſay. They have been but twice bitted, and appear to me to be quite as docile as colts would be at their age. They apply their whole ſtrength to the draught, and go on a ſteady pace. Their mouths appear to be very tender, and ſome care is neceſſary to prevent their being injured by the bit. Mine are about two years old, and are not leſs than thirteen hands high: their thighs are as muſcular as thoſe of the horſe. In their native woods, the males grow to about fifteen hands, as far as I can collect from the information of hunters. It is probable, however, that, in a ſtate of domeſticity, they would grow much larger, as all graminivorous animals are pinched for food, in our climate, during the winter. Their gaits are a walk and a trot: they never bound like the ſtag. If, upon trial, it is found that the elk can be rendered uſeful in the harneſs, it would, in many views, be an acquiſition: as its trot is very rapid, it is probable that, in light carriages, they would out-travel the horſe. The rein-deer affords abundance of rich milk. It is not to be doubted, that the animal,

which is only a larger ſpecies of rein-deer, might be brought to furniſh our dairies. It appears to me to be leſs delicate in its food than a horſe. Mine have been kept fat on hay alone, though they were very negligently attended. They are long lived, and more productive than any domeſtic beaſt of burden, generally producing two fawns at a birth. By caſtration they may be prevented from getting horns, if, as I ſuppoſe, their enormous ſize ſhould be conſidered as inconvenient. It is probable, too, that the ſuperabundant nutriment which is annually expended upon the horns, would, in that caſe, add to the bulk of the body."

5. Improvements on the ſteam-engine (p. 89); intended to ſave power by leſſening friction. 6. A diſcovery of a new material for paper, in the conferva rivularis, growing in the Hudſon, with the method of manufacturing the ſame. After an account of his firſt experiments with a mortar, a punch-ſieve, and a bit of canvaſs, the Chancellor proceeds thus:

" I communicated my diſcovery to my neighbour, Mr. Delabigarre, and he entered very heartily into it, and made many experiments himſelf, in conſequence of, and in confirmation of mine, and felt ſuch an intereſt in its ſucceſs, as to propoſe ſuperintending the firſt experiment that I propoſed to make at a paper-mill, at Kaat's-kill, whither he went with 80lb. of the material, all except about 15lb. of which had been dried in the ſun. When he arrived, he found great difficulty in perſuading the workmen to make the experiment, which they conſidered as hopeleſs. Having, by dint of arguments and brandy, overcome their prejudices, they conſented to make the attempt; but as their veſſels were too large for the quantity of materials brought them, and as he wiſhed, at all events, to cover himſelf (though it were with rags and tatters) from the ridicule that awaited him, a number of perſons attending to ſee the experiment, he propoſed to add $\frac{1}{4}$ of coarſe rags. The maſter-workman, however, preferred only adding 10lb. of rags, or 1-9. Before he had given it half the trituration uſual with rags, he found the paſte perfect; and, upon trying it, he was ſurprized to find that it came off from the mould quicker and cleaner than linen rags, ſo that much more may be worked in the ſame time. Mr. Delabigarre not having leiſure to wait the uſual proceſs of preſſing, drying, &c. brought away a quantity (of which the ſamples I ſend you are part), haſtily dried over the fire. The wrapping-paper you will find ſuperior to that made of rags. The hanging-paper is better than the Engliſh paper commonly applied to that uſe; and I am

perſuaded, from the texture of the material, that, when ſufficiently waſhed, fine paper may be made of it. But ſhould it not, the demand for the ſorts now ſent you, and for ſheathing-paper, would render the diſcovery very important. The want of materials has hitherto kept our mills from being ſufficiently employed; and thoſe materials, together with great quantities of paper, are annually imported. My material is ſo abundant in Hudſon's River, during the ſummer months, that two men may procure as much as two or three tons in a day; and, ſhould it be equally plenty in other rivers, and not be found of the ſame quality elſewhere, I am perſuaded that we may not only ſupply America, but Europe, with paper, as well as give facility to thoſe manufactures that depend upon it, as paper-ſtaining, marbled paper, band-boxes, book-binding, &c."

7. Obſervations on the means of improving the manufacture of flour, and diminiſhing the conſumption of water, in moving the machinery of mills (p. 153), by enabling mill-ſtones, in reducing grain to meal, to act rather by *attrition* than *preſſure*. This paper, with the engraving annexed, are highly worthy of attention, as ſuggeſting what appears to be an eaſy and obvious mode of facilitating the grinding of bread-corn.

8. Obſervations on the manner in which bot-worms are generated in horſes, and the means of prevention; accompanying Major Billings's letter on the ſame ſubject. The ſubſtance of theſe letters is, that the bot-worm, infeſting the inteſtines of horſes, is hatched from the egg often ſeen on the hairs of the legs and bellies of thoſe animals; that theſe are layed there by the nit-bee, or parent inſect; and that bots are afterwards transformed to ſuch winged creatures. Every perſon converſant with horſes, knows that a particular inſect depoſits nits on their hairs. The teſtimony of Mr. Billings is here adduced, to prove that a bot is hatched from ſuch an egg; and that of the late Dr. V. Wemple, that the nit-bee ſprings from the bot.

(To be continued.)

ART. IV. *A Brief Hiſtory of Epidemic and Peſtilential Diſeaſes, &c. By* Noah Webſter, *&c.*

[Continued from p. 288, and concluded.]

IN the eleventh ſection of the work, Mr. Webſter proceeds to confirm his doctrine of the occurrence of peſtilential periods depending upon a vitiated conſtitution of the atmoſphere, by exhibiting proofs of an increaſe of mortality, at the ſame times, in diſtant parts of the world. Sometimes, he obſerves, a ſeries of epidemics falls with more violence on one hemiſphere than on the other; but ſcarcely in a ſingle inſtance has a courſe of diſeaſes been ſpread over one continent without ſhowing themſelves on the other. Remarkable examples of this increaſe of mortality are exhibited by a compariſon of the bills of burials in London, Amſterdam, Vienna, Breſlaw, &c. in the ſame ſeaſons, demonſtrating, beyond all doubt, the operation of a common noxious cauſe. Concurring with theſe ſickly ſeaſons in Europe, malignant epidemics were found to rage in Egypt, in the Levant, and in other eaſtern countries. And, by reſorting to records, ſimilar coincidences are found to have exiſted in different parts of our own country.

In the twelfth ſection Mr. W. treats of influenza, or epidemic catarrh, which he concludes evidently to depend upon occult qualities of the atmoſphere, from its ſudden invaſion of whole families, towns and countries, as well as from the aſtoniſhing rapidity with which it ſometimes ſpreads over land and ſea, uncontrouled by heat or cold, drought or moiſture. This diſeaſe diſplays a wonderful coincidence, in time, with earthquakes, volcanoes, unuſual ſeaſons, and the appearance of comets. Mr. W. has been enabled, by his reſearches, to enlarge the number of theſe epidemics, noted by Sauvages, Cullen, &c.

The order, connection, and progreſſion of peſtilential epidemics, employ the attention of our author in the ſucceeding ſection. His object here is to prove, that the plague, and other peſtilential epidemics of the worſt kind, ſcarcely ever conſtitute an original, diſtinct, iſolated diſeaſe; but that they are the laſt or moſt mortal form of a ſeries of malignant diſtempers, whoſe riſe and progreſs, whoſe ſucceſſion and tranſition from one character and degree to another, as well as from one place to another, will generally admit of being ſa-

tisfactorily traced. The order in which these pestilential epidemics successively appear is not always exactly the same; as they are varied by a multitude of subordinate causes, such as seasons, weather, noxious exhalations, &c. Mr. W. finds, from the researches he has made, that the beginning of a series of malignant epidemics is commonly marked by the appearance of influenza or catarrh, and sometimes of measles or chincough; then follow the different species of angina, smallpox, or other eruptive diseases, remittent fevers, petechial fevers, dysentery, yellow fever, plague, &c. The progressiveness in the pestilential principle, beginning with the prevalence of diseases of a mild character, and ascending, step by step, in a longer or shorter time, to such as are more malignant and mortal, and the concurrence of this progressiveness, in distant regions of the earth, form the most important and instructive of all the results presented by this history of epidemics. On this ground alone, we conceive, unanswerable arguments may be raised against the doctrine of the importation and exportation of epidemical diseases; for this doctrine can never account for a multitude of the phenomena which are observed to precede, to accompany, and to follow the appearance of malignant distempers.

On the subject of the extent of a pestilential state of air, Mr. W. observes, that epidemical diseases are local or general; the former, those which are limited to a particular town, city or country; the latter, those which pervade whole quarters of the earth, or the whole globe. The most common local epidemics are dysentery, intermitting and remitting fevers, yellow fever and plague. The most universal epidemic is catarrh or influenza; next, in extent of prevalence, he supposes to be measles; and then follow the different species of angina. It is also well known, that pestilential fevers have, on many occasions, prevailed over vast tracts of the earth, and sometimes, perhaps, throughout the world.

The fifteenth section is devoted to the exhibition of further proofs of the connection subsisting between comets, earthquakes, volcanic explosions, &c. and the prevalence of pestilential diseases. After this exhibition, the author proceeds to offer some conjectures concerning the causes of these phenomena, whose coincidence and connection he thus labours to establish. He ascribes earthquakes, volcanic eruptions, &c. together with those constitutions of the atmosphere which produce pestilential diseases, to the operation of a common cause, and this cause he supposes to be the electric fluid. By

a ſurcharge of the atmoſphere with this fluid, he believes, a ſtimulus too ſtrong for the healthy actions of the animal ſyſtem to be created; or, by certain combinations of electric matter with other ſubſtances, or certain unknown operations of it upon ſuch ſubſtances, the noxious power in queſtion to be generated. The former ſuppoſition of a morbid action of the electric fluid itſelf is oppoſed by the fact of the mild, and often ſalutary effects of that fluid, when accumulated by inſulation in animal bodies. And the latter, of its combinations or its action upon other ſubſtances, thereby generating a noxious agent, is ſo vague and hypothetical as to contribute nothing to the enlargement of our knowledge on this ſubject. Electricity ſeems to be deeply concerned in the production of clouds, rain, hail, ſnow, and, probably, in many other atmoſpherical changes and operations. We do not deny its agency in earthquakes, volcanic eruptions, hurricanes, &c. but ſtill we think our acquaintance with it too imperfect and limited to warrant the adoption of the principles here propoſed by our author, further than as plauſible and ingenious conjectures. Dr. Shebbeare, many years ago, indulged himſelf in a variety of ſpeculations on this ſubject. He conſidered the human body as little elſe than an electrical machine—the brain as a large reſervoir of electric matter, and the nerves as the conductors by which it is diſtributed to all parts of the ſyſtem. To this agent he referred as the cauſe of animal heat, of muſcular motion, and of all the principal effects produced by the functions of reſpiration, digeſtion, &c.* It is not probable that the Dr.'s hypotheſis will avail much towards an elucidation of the laws of the animal economy, either in a ſtate of health or diſeaſe. But if Mr. W. ſhould be able to ſubſtantiate his opinions on this ſubject, by a further collection of facts, his concluſions will be received with an eagerneſs proportioned to their great importance.

In the ſixteenth ſection Mr. W. delivers the reſult of his inquiries concerning contagion and infection, and the means of diſtinguiſhing them from each other. His facts and illuſtrations on this ſubject poſſeſs great merit, and deſerve to be ſtudied with the utmoſt attention. He defines ſpecific contagion to be "that quality of the diſeaſe which, within a ſuitable diſtance, communicates it from a body affected with it to a ſound body, with great certainty, and under all circumſtances of ſeaſon, weather, or ſituation." We believe a very important diſtinction between ſpecific contagion and other miaſmata, named infection by Mr. Webſter, conſiſts in

* See Practice of Phyſic, vol. 1 and 2.

the former being always a matter of animal ſecretion, and the latter a product of chemical action, independent of vaſcular and vital energy.

In the following ſection our author treats of the means of preventing or mitigating peſtilential diſeaſes. It will be obvious that, ſo far as theſe diſeaſes depend upon an occult and general conſtitution of the atmoſphere, it is beyond the power of human means to correct the cauſe. Much, however, may be done by the removal of all local cauſes, by a free uſe of pure water, and by adopting proper means to guard and fortify our ſyſtems againſt the invaſion of theſe diſeaſes. Judicious directions are given for chooſing places of reſidence in the country, and an excellent plan is offered for building of cities, which we conſider of great importance, and take the liberty to recommend to the attention of every American citizen.

The remainder of the work is devoted to remarks on the diſappearance of the plague in ſome parts of Europe, and the occurrence of new diſeaſes—to obſervations concerning lunar influence, electricity, the popular modes of guarding againſt infection, veneſection, vapour or mephitic air, the revolution of certain comets—and to a poſtſcript containing ſeveral additional matters.

We obſerve, with ſome ſurpriſe, that Mr. W. has adopted the doctrine of *equivocal generation*, in order to account for the vaſt number of inſects and other animals which often diſtinguiſh the periods of peſtilential diſeaſes. The moſt eminent naturaliſts ſeem generally to have concurred in exploding this doctrine, for a conſiderable time paſt. Ever ſince the invention of microſcopes, the opinions formerly embraced, in favour of equivocal generation, both with reſpect to animals and plants, have rapidly declined. This inſtrument demonſtrates, that thoſe plants which formerly were ſuppoſed to be produced by equivocal generation, actually ſpring from ſeeds; and animals, in like manner, from ſexual intercourſe. It is true that difficulties ſtill remain with regard to the origin of the *animalcula infuſoria*, and ſome others of the claſs of the *vermes*; but the general analogy of nature, ſo far as diſcoveries hitherto go, ſeems to us greatly to outweigh ſuch difficulties.*

*. The atheiſtical tendency of this tenet has been aſſerted with great confidence; and the Abbé Barruel affirms, that it was made inſtrumental, among other things, in the overthrow of the altar and of the throne in France. But of this we offer no opinion. [*See Memoirs of Jacobiniſm.*

There is reaſon to apprehend that ſome of Mr. W.'s readers may be led aſtray by his ſeeming predilection for the medical principles of Dr. Brown. The excellence of many parts of that ſyſtem, and the ſpecioufneſs of the whole, have gained admittance for ſeveral errors of the moſt pernicious kind.—The admired diſtinctions of *ſthenic* and *aſthenic* diatheſis, of *direct* and *indirect* debility, though ſo plauſible and captivating upon paper, often prove utterly indiſtinct and unavailing, when we approach the bed of ſickneſs, and teſt them by their practical merits. Practitioners find, every day, in the complicated character of diſeaſes, as they actually appear, the *ſthenic* condition in one part of the ſyſtem, and the *aſthenic* in another. The Brunonian doctrine of the uniformity of the operation of ſtimulants, and the miſapplication and abuſes of exhibiting them in improper caſes, or in exceſſive quantities, have frequently produced pernicious effects, and perverted the beſt remedies into the moſt deadly poiſons. It is mortifying to recollect the enormities of medical miſconduct into which that ſpecious ſyſtem has often betrayed its unwary and impetuous advocates.

We are ſorry to obſerve Mr. W.'s averſion to veneſection in peſtilential diſeaſes. As this is a practical queſtion of the higheſt importance, it behoves every perſon who undertakes to diſcuſs it, to form his opinions after mature inquiry and reflection, enlightened and rectified by the reſults of experience. In ſuch a diſeaſe as that which has ſo fatally ravaged the cities of the United States, we ſhould be extremely reluctant to give up the benefits to be frequently expected from blood-letting. No perſon will deny that this remedy may be abuſed to the moſt deſtructive degree; but the ſame may be aſſerted of every efficacious agent in the practice of medicine. In our malignant epidemic we often ſee violent univerſal excitement, and the greateſt tenſion of the arterial ſyſtem, continued many days; and after the death of ſuch patients, diſſection exhibits every mark of congeſtion, inflammation, and conſequent diſorganization, in many of the viſcera eſſential to life. We ſhould as ſoon believe blood-letting to be inadmiſſible in phrenitis or pneumonia, as in ſuch a ſtate of the ſyſtem. And actual experience enables us to declare, that in ſuch inflammatory forms of the epidemic, no other remedy has appeared to effect ſo much for the deliverance of the patient.

The alexipharmic uſe of perſpiration will ſucceed in the lighter forms of the diſeaſe. But we cannot agree with Mr. W. in aſſerting that all practitioners pronounce perſpiration,

if induced on the firſt ſeizure of the patient, to be the moſt effectual preſcription: for we are perſuaded, that in the early as well as in the later ſtages of the diſeaſe, it is often impoſſible to excite that diſcharge from the ſkin by any means which could be ſafely employed, and that, if excited, it would be often altogether unavailing, and ſometimes poſitively miſchievous.

The following quotation, from the concluding chapter, addreſſed to the learned ſocieties in America, Europe and Aſia, containing ſome general views of the ſubject, and propoſing a plan of regiſtering and communicating facts, we think proper to lay before the reader.

"It is demonſtrated that peſtilence, in temperate latitudes, is never an iſolated epidemic, but the criſis of a ſeries of epidemics; and we are furniſhed with the means of determining, unequivocally, the character of peſtilence in every caſe, on the following ſimple principles:

"If, on the appearance of peſtilence in a particular place, all other diſeaſes ceaſe, or take ſome of its predominant ſymptoms, that peſtilence is generated in that place, and dependent on the ſtate of the elements."

"It is impoſſible, on phyſical laws, that this criterion ſhould ever fail.

"Another criterion, almoſt infallible, is the prevalence of certain diſeaſes before and after the peſtilence. If peſtilence is immediately preceded by meaſles, affections of the throat, inflammatory or typhus fevers with anomalous ſymptoms, and eſpecially by catarrh, that peſtilence is an epidemic, produced on the ſpot, and only the *autumnal form of diſeaſe*—the other diſeaſes, preceding and following, being the vernal and hybernal forms, produced by the ſame general principle.

"Of the peſtilences which afflict mankind, in all climates, an immenſe proportion, probably nineteen twentieths, belong to this ſpecies. They are epidemics, beginning and ending at the command of the elements, under the co-operating influence of ſeaſons and local cauſes.

"Theſe epidemic peſtilences are more or leſs infectious, according to their violence, or the places where they exiſt. In cloſe rooms and narrow alleys they are dangerous; hence their mortality in fleets, camps, jails, and particular parts of cities. But the infection of ſuch diſeaſes extends to the diſtance of a few feet only, and is capable of diſſipation in a free air, ſo as to reduce the danger of attending the ſick almoſt to nothing. The ſame is true of diſeaſes of mere infection, not epidemic.

"Diſeaſes, dependent on infection only, are ſometimes in-

troduced into cities and hoſpitals, and occaſion conſiderable mortality. But they are propagated by contact or near approach only, and do not affect the character of other diſeaſes current in the place.

" The conſequence reſulting from theſe principles is, that *epidemic* peſtilence is not under human controul—but diſeaſes, propagated by mere infection, may be arreſted and ſubdued.

" The only means of avoiding or mitigating epidemic peſtilence, are, firſt, to withdraw the aid of local cauſes: ſecondly, to fit the body, by modes of living, to reſiſt its cauſes: and, thirdly, on failure of theſe, to remove from the place where it exiſts.

" The infection of all diſeaſes, even thoſe of ſpecific contagion, as ſmall-pox and meaſles, may be avoided by keeping at a diſtance from the diſeaſed. The infection of diſeaſes not ſpecifically contagious, as plague, yellow-fever, dyſentery and jail fever, may be nearly deſtroyed by free air, and cleanlineſs.

" With reſpect to the primary cauſes of epidemic diſeaſes, we are in the dark; but we are certain, from all hiſtory and modern obſervations, that the cauſes of epidemic diſeaſes among the human race, affect every ſpecies of animal and vegetable life.

" The opinions which I have ſuggeſted concerning the general cauſe, ſeem to have a foundation in the coincidence of epidemic diſeaſes with numerous electrical phenomena. At the ſame time, the reader will conſider theſe opinions rather as *conjectural* than *poſitive*. No certain concluſions can be drawn from an interrupted and imperfect ſeries of facts. More materials are neceſſary to enable us to erect a theory of epidemics which ſhall deſerve full confidence.

" The common doctrine of contagion is utterly inſufficient and unphiloſophical; for, if admitted, it never leads us nearer to the cauſe. If we trace the yellow fever to the Weſt-Indies, and the plague to Egypt or Conſtantinople, we are not an inch nearer to the ſource; for theſe diſeaſes are not always to be found in thoſe countries; and the people there are as much puzzled to find the ſource of them as the people of Great-Britain or America.

" If we trace theſe diſeaſes to the coaſt of Africa, or to Siam, we are as diſtant as ever from the ſource; for many times the diſeaſes are not to be found in thoſe countries, and ſeldom, indeed, are they found within the tropics, except among foreigners.

" Indeed, nothing is more common than for the yellow

fever to be *imported into the Weſt-Indies in veſſels from the United States.* When veſſels from northern latitudes have long paſſages, it often happens that ſeamen are ſeized with the diſeaſe, before they arrive at the iſlands; and the Weſt-Indians may often allege the diſeaſe to be *imported in ſuch veſſels, when it does not exiſt in the United States.*

" In ſhort, the doctrine of deriving all peſtilential diſeaſes from contagion or infection, were it not for the immenſe miſchief it does to ſociety, would not deſerve a ſerious refutation. Infection is a *ſubordinate cauſe* of the propagating of malignant diſtempers; but is itſelf an *effect* of ſome more general cauſe, whoſe force is a hundred fold more powerful and formidable than that of infection. I have, in condeſcenſion to popular opinion, ſtated the evidence of the domeſtic origin of the bilious plague, as it ſtands on the arrival or non-arrival of veſſels, and other facts of that kind. But I really conſider all this evidence as trifling, when compared with the phenomena of the diſeaſe itſelf, and its precurſors and attendants. The uniform appearance of other epidemics, as introductory to peſtilence, and manifeſting an eſſential change in the atmoſphere, with the numerous accompaniments of the plague and yellow fever, amounts to evidence of domeſtic origin, which leaves no room for cavil or controverſy.

" For the purpoſe of collecting facts, the only ſafe foundation of principles, and comparing the phenomena of diſeaſes and the elements, which occur nearly at the ſame time, in different countries, I ſincerely wiſh and requeſt, that all medical and philoſophical ſocieties would undertake to regiſter facts, and reciprocally to communicate them, by means of a general correſpondence. The facts to be regiſtered might be compriz-ed under the following heads:

" The time of the appearance and diſappearance of any epidemic diſeaſe, with its general hiſtory.

" The places where it firſt occurs to be deſcribed, in regard to land and water, height of the land, conſtruction of the city or ſtreets, poſition as to points of compaſs, woods, moraſſes, &c. The claſſes of people moſt generally affected.

" The general ſtate of the ſeaſons, as to heat and cold, drought and moiſture.

" The time of earthquakes, meteors, lumen boreale, and all ſingular celeſtial appearances—with unuſual tempeſts, eſpecially when accompanied with hail—all compared with the lunar phenomena.

" The appearance of unuſual inſects of all kinds, and any circumſtance attending them.

" Diſeaſes among cattle, ſheep, and other animals.

" Sickneſs and death of fiſh of all kinds.

" Volcanic eruptions, with the phenomena preceding, attending and following them.

" For the purpoſe of aſcertaining the lunar influence on the human body, or any diurnal influence, it would be deſirable that medical gentlemen ſhould note the days, and the hours of the day, when perſons are ſeized with particular diſeaſes, eſpecially epidemics—the hours of exacerbation and of paroxyſms in fever—the hours which are moſt fatal to the diſeaſed—and the time when convaleſcents are moſt apt to relapſe. —Theſe facts ſhould be compared with the poſition of the moon in her orbit, and eſpecially in regard to her perigee and apogee, conjunction and oppoſition, as alſo with the tides in the main ocean.*

" Should the principles unfolded in the preceding work prove to be well founded, they will lead to many important practical inferences.

" I. If peſtilential fevers never appear in the temperate latitudes, without certain precurſors, men will, with careful obſervations, be enabled to foreſee the danger, and prepare for it; or to uſe uncommon diligence in removing the ſubordinate local cauſes.

" II. If, in certain years, peſtilential fevers are more predominant than in others, and the condition of the elements fitted to produce them is univerſal over ſea and land, the fact is of no ſmall moment in maritime affairs. Double precautions will be taken in fleets, and in merchantmen bound on long voyages.

" III. If peſtilence is progreſſive, and firſt manifeſted in certain malignant fevers, the fact may be of great utility to large cities. The approach may be perceived in time to ſave the inhabitants by flight, if not by other precautions.

" IV. If no plague or yellow fever ever appeared in temperate climates, unleſs announced by other diſtempers, the magiſtracy may be enabled to diſtinguiſh when there is danger, and when not; and may avoid innumerable vexations to commerce, ariſing from the rigid execution of health laws, when there is not the leaſt occaſion.

* " The time of high and low water in rivers and bays may not be the true time in the open ſea—or of the greateſt and leaſt influence of the moon.

"V. But a moſt important uſe to be made of the facts here collected, will be, to guard public health from the ill effects of bad proviſions. If, in peſtilential periods, ſalt is leſs efficacious in preſerving fleſh; and, by means of a greater fermentation of the juices, fiſh and fleſh are more readily diſſolved by a putrefactive proceſs, more caution will be found neceſſary in packing and repacking them, and more care to avoid uſing it in a bad ſtate."

We cloſe our review of this work, in the hope that the author will continue to beſtow his attention on a ſubject which is ſtill far from being exhauſted, and to which his talents ſeem to be eminently adapted. It will give us great pleaſure to ſee this new path of hiſtory ſtill further explored, with the ſame ardour and ſucceſs which diſtinguiſh theſe volumes. Notwithſtanding all the indifference which literary and ſcientific labours too often meet from the public, we are confident this work will be peruſed by all who ſeek information on this momentous ſubject; and, at the ſame time that the benefits of it are diffuſed far and wide, that it will remain a laſting monument of the fervour of the author's zeal in the cauſe of truth, and of the vigour and comprehenſiveneſs of his mind.

ART. V. *A Sketch of the Riſe and Progreſs of the Yellow Fever, and of the Proceedings of the Board of Health in Philadelphia, in the Year* 1799: *to which is added, a Collection of Facts and Obſervations reſpecting the Origin of the Yellow Fever in this Country, and a Review of the different Modes of treating it. By* William Currie, *Fellow of the College of Phyſicians, and Member of the American Philoſophical Society, &c. Philadelphia.* Budd *and* Bartram. 8vo. pp. 112. 1800.

TWO American phyſicians, Dr. Currie of Philadelphia, and Dr. David Hoſack of New-York, are aſſociated in this performance; and we ſcarcely ever recollect to have ſeen, in a work of partnerſhip, a happier coincidence of opinions, or a more exact equipoiſe of powers exerted to ſupport a common cauſe. The expectation of ſeeing a large maſs of facts and of reaſonings on this intereſting ſubject, has been held out to the public, by theſe gentlemen, for a long time paſt; and it is reaſonable to conclude, that, in this

long interval, every fact and every argument has been so deeply revolved in their minds, as to render this publication the highest effort they are capable of making to establish their doctrine. But we must confess, if this be the fruit of such profound and mature reflections—if this exhibit the highest evidence of the contagiousness and importation of the yellow fever, that we shall not hesitate to adhere to our former opinions.

When we reviewed the "Memoirs of the Yellow Fever for 1798," in Med. Repos. vol. ii. p. 312, by the former of these gentlemen, we delivered our opinion on the degree of value and importance which we supposed them to possess. Our readers will remember that we rated them very low on the scale of literary and medical merit. After the friendly remarks which we made, and the gentle criticisms we offered at that time, we flattered ourselves we should not soon be presented with another piece on the same subject, from the same hand, and breathing a similar spirit. In this, however, the persevering disposition of Dr. C. has disappointed us. He seems determined to give us an *annual* assurance of his conviction that yellow fever is both *imported* and *contagious*; and in doing this he manifests an eagerness and earnestness worthy a better cause.

The principal part of the first thirty-two pages is devoted to what the writer calls *the sketch*. The facts which Dr. C. produces in proof of the importation of the disease, in 1799, from the West-Indies or from Hamburgh, would be considered, by an indifferent person, as rather meant to establish its domestic origin. A chief object of the sketch is to shew the inattention or carelessness of the health-officers, in suffering such intercourse between the West-India vessels and the city of Philadelphia, as to introduce thereby the contagion of yellow fever; and also to display the greater vigilance, judgment and foresight of Dr. C. himself. There is, too, an imperfect account of the weather during the sickly season. We observe the writer, as in the former piece, is at variance with the health-office. He is clear the men in commission do not manage matters rightly. Why has not the government of Pennsylvania, long ago, made the publisher of this pamphlet a member or president of the Board of Health?

In the course of the next thirty pages, or more, Dr. C. assigns the reasons at large which induce him to think the yellow fever contagious. These are mostly quotations from the trite and common accounts of disease and death, produced by septic air and poisonous vapours; but containing no stronger

evidence of ſpecific contagion than the opinions and declarations of the writers themſelves, and of this compiler. They tend merely to confirm the well-known doctrine of perſpired, excreted and corrupting matters in the alimentary canal, and in jails, hoſpitals, dirty dwelling-houſes, and eſpecially in ſhips and veſſels, turning to peſtilential miaſmata by chemical action among their inteſtine particles, and poiſoning moſt of thoſe who are expoſed to their action, except ſuch as are ſeaſoned to them. If ſhips were cleanſed, from keel to deck, as houſes are by neat inhabitants, ſeveral times a year, from cellar to garret, and by the ſame method of lime and ley, we ſhould hear very little of the naſtineſs and poiſon which, in the preſent ſtate of navigation, are ſo deſtructive within them. Why did Lord Anſon loſe abundance of men, and Capt. Cook none, by fevers, ſcurvies and dyſenteries, but becauſe the latter attended more to diet, regimen, and cleanlineſs of perſon, clothing and ſhip, than the former?

Toward the cloſe of the piece, Dr. C. attempts to diſcriminate between yellow fever and bilious fever, by ſymptoms which we have never been able to obſerve as diagnoſtics in practice. He contraſts the mild forms of the latter with the malignant and fatal character of the former; and ſuch a contraſt does, indeed, preſent a difference both of degree and event. There is a wide interval between a morbid ſtimulus of the ſtomach and inteſtines, which cauſes the diſcharge of large quantities of bile by vomiting and ſtool, and another which converts theſe diſcharges into an oozing of blood and a deluge of black matter. We can likewiſe help the Doctor to another diſtinction, equally practical and uſeful, which may poſſibly ſerve to illuminate the career of his future practice. Diſeaſes uſually confounded under the title of pneumonia, are known ſometimes to terminate happily by reſolution and expectoration; ſometimes fatally by effuſion of blood or other fluids into the cellular ſubſtance of the lungs. Dr. C. muſt deſert his principle, or call theſe diſeaſes by different names.—He expreſſes warm diſapprobation of ſalivating by preparations of quick-ſilver, and recommends oxygenated muriate of pot-aſh for charging the conſtitution with the principle of acidity.

Dr. C. aſſerts, that the doctrine of variable epidemic conſtitutions of the atmoſphere "is ſo palpably erroneous, that the New-York reviewers (as he is pleaſed to ſtile us) have given judgment againſt it." This is a groſs miſtatement of our opinion. The reaſoning which he quotes from our Re-

poſitory (vol. i. p. 76, 77), as intended to deny the exiſtence of ſuch conſtitutions, was only deſigned to prove that they do not depend upon the atmoſphere being ſurcharged with oxygenous air. As to the exiſtence of theſe epidemic conſtitutions, we have repeatedly and ſtrenuouſly maintained the affirmative; and the beſt apology we can offer for this miſtake, is to ſuppoſe Dr. C.'s mind unaccuſtomed to the intricacy of diſtinguiſhing between a fact itſelf, and an hypotheſis employed to explain it.

Supplementary to the pamphlet, we find an abſtract of the ſtatement, publiſhed in the newſpapers, of the ſhip General Wayne, about which there was much controverſy at New-York, in 1799; and a quotation of a letter aſcribed to Dr. Blane, containing his obſervations on ſickneſs in the Britiſh navy, which has been publiſhed in the gazettes alſo, tending to prove the contagious nature of the diſtemper. The evidence from theſe quarters is not more cogent or pointed than from thoſe already mentioned.

The pamphlet is concluded by two letters from Dr. D. Hoſack to the author, in which it is intended to be ſhewn, not only that the poiſon of yellow fever lay over from the preceding ſeaſon, but that perſons ill of the diſeaſe, on arriving from infected ports, were permitted to come to the city of New-York with their veſſels, without undergoing a regular quarantine.—We ourſelves were on the ſpot, and are ſatisfied the facts might have been ſtated in a more full and correct manner. For a more complete account of the effects wrought by the ſeptic acid vapours of putrefying beef than is here given, ſee the preſent volume of our work, p. 309. And that the particulars of the late John F. Roorbach's caſe, which has been very much talked of, and ſomewhat miſrepreſented, may be properly underſtood, we inſert, at length, the perſpicuous ſtatement thereof, drawn up by Tunis Wortman, Eſq. and communicated ſoon after the gentleman's death. It is as follows:

DEAR SIR,

AGREEABLY to your requeſt, I ſhall now furniſh you with ſuch of the particulars connected with the death of the late Mr. Roorbach, as have come to my knowledge or obſervation.

He removed from the city in the latter part of the month of Auguſt laſt. He had been abſent from town during the pe-

riod of at leaſt four weeks before he was taken with the fever. It is certain that he never viſited the city ſince his removal from it in Auguſt.

From the time of his removal to that of his illneſs, his health was apparently good. Mrs. Roorbach had, however, remarked a viſible decline in his ſpirits. She obſerves, that before his departure from town he had loſt much of his uſual cheerfulneſs and vivacity.

Should it be decided that the contagion was not received in the city, there are only three circumſtances to which, or one of them, his illneſs can with any probability be imputed.

At his removal to Long-Iſland, he was accompanied by a ſervant boy, of the age of about fourteen years. Not having occaſion for the ſervices of the boy, he was ſent to Middletown-Point, in New-Jerſey, in ſearch of his father, three days after his arrival at Long-Iſland. The boy went to the city in his way to Middletown-Point. He remained in the city about half a day, and then departed on his journey. He remained in New-Jerſey four days; and, not finding his father, returned to New-York. On his return, he tarried near two days in the city, and then again went to Long-Iſland. On the ſecond day after his return to Long-Iſland, he was taken with the fever, and remained ill for a conſiderable time before his recovery.

It is to be obſerved, that, during the illneſs of the boy, he was not lodged in the ſame houſe with Mr. Roorbach; but was furniſhed with an apartment, in the upper part of a building, diſtant at leaſt forty yards from the houſe in which the family reſided, and having no communication with it. I have always underſtood, and believe, that Mr. Roorbach did not viſit the boy at any period in which he was in danger; but, on the contrary, avoided ſeeing him until his recovery was conſidered as certain.

About a week after his removal, a barrel of beef was ſent to him from town. He was preſent at the opening of the barrel, which immediately afterwards took place. The beef was found unfit for uſe, and buried. A piece of it was boiled, under an idea that the oily part of it might prove ſerviceable for ſome purpoſes of family economy. It was afterwards deemed moſt prudent to bury the whole. Although unfit for uſe, I have underſtood that the beef was not, in a very great degree, offenſive. And neither Mrs. Titus, nor the two black perſons, who were moſt inſtrumental in opening the barrel, contracted any ſymptoms of diſeaſe.

As nearly as my memory ſerves me, and I believe that I am accurate, about a week previous to Mr. Roorbach's being ſeized with the epidemic, another barrel of beef or pork, ſuppoſed to have been thrown overboard, and to have floated from New-York, became lodged along the beach, between the houſe in which Mr. Roorbach reſided and that next adjoining. It was taken up by one of the neighbouring negroes, and placed at high-water-mark, within the diſtance of ſix or eight yards from the bank, and from the common foot-path of paſſengers. The object of the negro was to preſerve the barrel. He was actuated by that greedy purſuit of gain which is ſo common among men.

This foot-path was frequented every day by Mr. Roorbach. He walked paſt the fatal ſpot upon an average of at leaſt three times every twenty-four hours. I can teſtify, that of all the horrid ſmells I have ever experienced, that emitted by this laſt barrel was the worſt. Heaven only knows by what fatality it was ſuffered to remain ſo long unmoleſted on that ſpot; for it was not removed until the day of Mr. Roorbach's death, which was the third of October laſt.

He died on Wedneſday, the third of October, and was taken ill the Friday preceding.

This, Sir, is a ſtatement of ſuch circumſtances as I recollect. You can beſt determine which of them muſt have been the fatal cauſe.

Yours, with great reſpect,

T. WORTMAN.

December 11, 1798.

Dr. SAMUEL L. MITCHILL.

Dr. Hoſack writes warmly in favour of *lime-water*, as an excellent remedy in that ſpecies of black-vomiting in which the matter diſcharged reſembles coffee-grounds, and offers certificates of two phyſicians of New-York, S. Bard and J. Charlton, in favour of its ſucceſs. This is, doubtleſs, oftentimes a very ſafe and proper preſcription, and is a branch of Dr. Mitchill's doctrine of alkaline remedies, written early in 1797, and publiſhed in Med. Repoſ. vol. i. No. 2, appendix; wherein it is ſtated, that *lime operated by neutralizing ſeptic acid* in the alimentary canal. In the poſtſcript to the piece now before us, Dr. C. the editor, ſtates, on the authority of Dr. Cathrall's experiments, a confirmation of this; that lime-water really produces its ſalutary effects, *by neutralizing the corroſive acid*, which is generally contained in the ſtomach at

the time the black vomiting commences. After that piece above-mentioned had been perused in Portland, the letter on the efficacy of alkaline remedies in fevers, written by Dr. Barker in consequence, though published in Med. Repos. vol. ii. p. 147, had been received by the editors, and read publicly to the students of physic in the New-York Hospital, early in the season of 1798. And Dr. Lent's Dissertation on the destruction of pestilential fluids by alkalies, had been openly defended in Columbia-College at a still earlier day (May, 1798), and reviewed in our vol. ii. p. 96. Indeed, Grainger's case of obstinate dysentery cured by lime-water, in 2 Phys. and Literary Essays, p. 282, had been read to the young gentlemen in the hospital library, and commented on by Dr. Mitchill, who was then in attendance there; and in his prescriptions, this remedy, as well as weak solutions of *carbonate of pot-ash*, were commonly set aside, and made to give place to a more agreeable and more efficacious alkali than either—*carbonate of soda* dissolved in water; a remedy preferable, on every principle, to lime-water.

Besides all this, as the sickly season of 1798 advanced, the floors of a number of private houses in the city, and even the public room of the Bank of New-York, pursuant to Dr. Mitchill's ideas, had been sprinkled with solutions of pearl-ash, or weak alkaline ley, to absorb and neutralize noxious exhalations, and thereby act as correctors of pestilential air.

Such was the state of information among the citizens of New York, when some uneasiness arose in Albany, lest the yellow fever should break out in that city. The Common Council and the physicians held meetings, and suitable means of prevention were agreed upon. The printed proceedings had been forwarded to Dr. Mitchill by Dr. De Witt; and, with the intent of informing the gentlemen of that place what solid reliance might be placed on alkalies, Dr. Mitchill had written a summary of the facts, in the form of an anonymous paragraph, which was inserted in the Daily Gazette of New-York, for September 6, 1798—a paper which he knew was read by one of his acquaintance, a gentleman of influence in Albany. And this is the paragraph alluded to in the "advertisement," as Dr. Hosack calls it, of Dr. Bard.

We find only one remarkable exception to the coincidence of opinions which prevails between the gentlemen who compose the fraternity of authorship in this pamphlet. While Dr. H. *most devoutly* recommends sweating, procured by

warm drinks, additional blankets, and, where theſe are not ſufficient, by heated bricks—Dr. C. declares as follows: "The ſweating treatment, by the means directed by Dr. Warren, of Barbadoes, and by cordial and ſtimulating remedies, and the external applications of heat and moiſture, whether with or without a load of oppreſſive bed-clothes, as far as I have been able to learn, proved not only unſucceſsful, but, in the majority of caſes that ſubmitted to it, was a ſpeedy though painful paſſport to the grave." The attempt, in a poſtſcript, to reconcile theſe contradictions, is utterly inſufficient.

On ſeveral occaſions we have found reaſon to obſerve an unexpected feebleneſs in the attempts to ſupport the doctrine of the foreign origin of the yellow fever. The pamphlet before us is not calculated to diminiſh this impreſſion. And though we reject, with ſtrong conviction, the influence of imported contagion, in the origin and propagation of that diſeaſe, we are perſuaded that theſe gentlemen have not made the moſt of their cauſe, and that facts and arguments *might be* adduced, to give it, at leaſt, a more plauſible colouring. For the ſake of the complete elucidation of truth, and the ſatisfaction of all parties, we ſhall be happy to ſee the opinion of the importers vindicated by ſome more nervous arm; of which we, as reviewers, as well as the future medical hiſtorians of America, may ſay,

"Si Pergama dextrâ
"Defendi poſſent, etiam hâc defenſa fuiſſent."

ART. VI. *Chemical Syllabus.* *By* John Vaughan, *M. D. Wilmington (Delaware).* Bonſal *and* Niles. 12mo. pp. 21. 1799.

IT ſeems that the Philoſophical Society of the State of Delaware has requeſted the compiler of this Syllabus to exhibit a courſe of chemical experiments, and that the piece we have in our hands is an outline of the plan, and an explanation of the technical terms employed in executing the buſineſs aſſigned to him. Of this it is ſufficient to ſay, that Dr. Vaughan adopts the French Nomenclature, without the American amendments.

This plan of inſtruction has ſucceeded beyond the ſanguine expectations of thoſe who firſt ſketched the deſign. A large

audience of both ſexes was collected to attend theſe lectures; and the ſubject has gained ſo much intereſt and popularity, that another courſe, and a regular ſucceſſion of theſe ſeaſons of inſtruction will doubtleſs be undertaken. It is to be hoped the ſociety will enlarge their ſcheme in future, and ſpeedily acquire ſuch maturity of arrangement as to render the benefits of their inſtitution permanent.

It is pleaſing to ſee the principles of ſcience familiarized to a large portion of the community, in a manner ſo cheap, eaſy and popular. It is juſtly the boaſt of modern times, that ſcience deſcends from the chairs of profeſſors, and from the pages of ponderous volumes, aſſumes every ſhape and accepts every ſtation, in order to accompliſh the great end of public inſtruction and utility. The exertions of Dr. Vaughan and his aſſociates deſerve our commendation; and we hope their example will be followed, with equal zeal and ſucceſs, in many other parts of the United States.

ART. VII. *The Midwives' Monitor and Mothers' Mirror. Being three concluding Lectures of a Courſe of Inſtruction on Midwifery. Containing Directions for Pregnant Women; Rules for the Management of Natural Births, and for early diſcovering when the Aid of a Phyſician is neceſſary; and Cautions for Nurſes, reſpecting both the Mother and Child. To which is prefixed, a Syllabus of Lectures on that Subject. By* Valentine Seaman, *M. D. one of the Surgeons of the New-York Hoſpital, and Phyſician Extraordinary to the Lying-in Ward in the Alms-Houſe. New-York.* Collins. 12mo. pp. 123. 1800.

UNDER the head of *Intelligence* (Med. Repoſ. vol. iii. p. 302), in our laſt number, we announced this work. Its object and contents are ſo fully ſet forth in the title-page, which we have inſerted at full length, that there will be leſs reaſon to deſcend to particulars, in giving an account of it. We muſt, however, obſerve, that it is very well calculated to anſwer the purpoſes of Dr. Seaman, whoſe zeal in the benevolent work of inſtructing *females* in the obſtetric art, entitles him to a good ſhare of applauſe. We alſo expreſs our opinion, that ſuch *women* as intend to qualify themſelves for aſ-

ſiſting others, in caſes of pregnancy and labour, may conſult this *Monitor* with ſatisfaction and advantage; and they whoſe delicacy is too much affected to look to accoucheurs for advice in their own caſes, may contemplate themſelves before this *Mirror*, without bluſhing or embarraſſment.

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

FEVER *and* DYSENTERY *produced by the* SEPTIC VAPOURS *of* PRIVIES.

BY a late ordinance of the Corporation of New-York, the inhabitants of the eaſtern ſide of the city were directed to have the pits or ſinks of their privies, many of which were filled, and overflowing with human excrement, emptied and cleanſed by or before April 1, 1800. This foul work was chiefly undertaken by negroes, who entered upon it by the lure of very high wages. Of theſe black night-men the greater part have been ſick, and ſome have died. The ſymptoms they experienced from the effluvia of the human ordure to which they were expoſed, were *catarrhs*, and *remarkable redneſs and inflammation of the eyes*; frequent *nauſea*, *vomiting*, and *loſs of appetite*; and *pains in the belly*, *griping*, *teneſmus*, and *bloody ſtools*, or *dyſentery*; to which were added, *febrile commotion* in the conſtitution, of various degrees of violence, according to conſtitution and other circumſtances, ſometimes terminating in death.—Theſe ſymptoms accord moſt exactly with the poiſonous effects wrought by the *acid* vapours of putrid beef, of which we gave an account in our preſent volume, p. 309, and are highly inſtructive; evincing, at once, their virulence, their acidity, and, of courſe, their deſtructibility by alkaline ſalts and earths. RAMMAZZINI, who lived at Padua, has written a chapter, in his *Treatiſe de Morbis Artificum* (cap. xiii.) on the diſeaſe of thoſe whoſe employment is the cleaning of privy-pits. The principal ſymptom he mentions is an inflammation of the eyes, often terminating in blindneſs; and this he aſcribes to the operation of a volatile acid; *(acidum volatile eſſe quod hujuſmodi camurinâ commota, exſpiret, mihi proclive eſt arbitrari, &c.)* He quotes the blackening of copper, ſilver and braſs, as well as of oil-paintings, in ſupport of his opinion. It is probable, however, that he had not inquired very extenſively into the ſubject, or he would have acquired the

knowledge of as many additional facts as have fallen under our notice. The reaſon why human fæces and their exhalations, though noxious, are, however, not ſo much ſo as the crude and undigeſted ingredients of food, in a putreſcent ſtate, would be very obvious and eaſy to aſſign. The alimentary maſs is mingled with a portion of *muriate of ſoda* (common ſalt), and of *bitter of ſoda* (fluid bile or gall), both of which moſt powerfully neutralize the ſeptic acid, or exciting cauſe of the inconveniences complained of (ſee Med. Repoſ. vol. ii. p. 292), and leſſen its deſtructive qualities.

OXYDATION *of* SILVER *by the* SEPTIC ACID *contained in the* ABDOMEN *of a Perſon dead of* ENTERITIS. *In a Letter from Dr. D. Hoſack, Profeſſor of Materia Medica and Botany in Columbia College, to Dr. Mitchill; dated New-York, Feb.* 23, 1800.

SIR,

Yeſterday afternoon, in company with Dr. Hamerſley, I examined the body of a young man, who died the night before, in conſequence of an inflammation of the bowels. Upon opening the belly, we found in its cavity about three pints of fluid, of a greeniſh colour, and of an intermediate conſiſtence between ſerum and pus. In the courſe of a few minutes, while examining the ſtate of the viſcera, I experienced a diſagreeable and ſomewhat painful ſenſation in my hands and fingers, ſimilar to the heat and burning excited by immerſing the hands in ſtrong brine. This remained a conſiderable time (not leſs than two hours), notwithſtanding I had carefully and repeatedly waſhed my hands with ſoap and water. This liquor proving cauſtic to my hands, I dipped into it a piece of ſilver, which was inſtantly changed from a pure white to a yellowiſh colour, approaching the hue of copper. As you have latterly been much devoted to an inveſtigation of the chemical qualities of the animal fluids, as connected with diſeaſe, I beg leave to encloſe you the piece of ſilver* which was the ſubject of this experiment.

* This was 1-16 of a Spaniſh dollar piece, coined in 1760, in the reign of Ferdinand the ſixth. By expoſure to a red heat on an iron ſhovel, with ignited charcoal, it turned to a leaden colour in leſs than two minutes; and the prominences or baſs-reliefs of the coin were of a deeper leaden colour than the other parts. This colour was not wholly changed to a ſilver hue again, by being heated red-hot with charcoal and pot-aſh, but remained conſiderably duſky.

Leſt it ſhould be conſidered as a mere ſtain imparted by the colour of the liquor, I add, that it is of a different colour from that of the fluid in which it was immerſed; and it has been ſince waſhed with water, without loſing any of the colour you now obſerve it to poſſeſs. It may not be irrelative to add the following account of the appearances exhibited by diſſection. Immediately upon opening the cavity of the abdomen, a great quantity of gas was diſcharged, and was extremely offenſive. The *omentum* exhibited a great degree of inflammation, and, in ſome portions of it, was in a ſtate of ſphacelus; and inſtead of lying looſely over the inteſtines, it adhered to the latter very generally.

Upon removing the omentum, we found the inteſtines in a ſimilar ſtate—their veſſels very much diſtended with blood, and, in ſome parts of them, an appearance of mortification. In addition to theſe circumſtances, we found the inteſtines adhering to one another with conſiderable firmneſs; and, upon carefully ſeparating them, obſerved a layer of matter, apparently compoſed of pus and lymph, which had united them, and had become ſomewhat membranous. The other viſcera of the belly appeared to have undergone no important change.

I am, Sir, yours,

DAVID HOSACK.

Dr. S. L. MITCHILL.

CULTURE *of the* VINE *in the* UNITED STATES.

During fifteen years, Peter Legaux, of Springmill, thirteen miles N. N. W. of Philadelphia, has been engaged in cultivating vines. He propagates the kinds which, in France, produce the *Champagne*, *Burgundy* and *Bourdeaux* wines; and that which, at the Cape of Good Hope, affords the *Conſtantia* wine. In the year 1793 he had his firſt vintage from the three former, which are now naturalized to the American ſoil. Mr. Legaux declares it as the reſult of his experience, that the 40th degree of latitude N. on the atlantic ſide of America, in point of vegetation and general temperature, is like the 48th or 49th in Europe. His vines have ſo thriven and increaſed, that they have afforded not only liquors to drink, but, at this time, they abound with ſhoots for cuttings, to plant and rear other vineyards. For the purpoſe of encouraging the cultivation of vines, the Legiſlature of Pennſylvania, on the 7th of March, 1800, paſſed an act, appointing fifteen Commiſſioners to procure ſubſcriptions for raiſing a capital in ſhares, to be applied to the furtherance of this ob-

ject. After one thouſand ſhares are ſubſcribed, the company is to be incorporated. Each ſhare is fixed at twenty dollars. The Commiſſioners expreſs their conviction, that the Americans have it in their power to ſupply themſelves with wine of their own growth, equal in ſtrength and flavour, and ſuperior in wholeſomeneſs and purity, to any which they can import. The means by which they are attempting to accompliſh this are, firſt, by raiſing in their own vineyards a conſtant ſupply of the plants, of the beſt ſpecies of vines, to be diſtributed abundantly, and on eaſy terms, throughout the country. Secondly, by training a number of vine-dreſſers, who, having acquired the neceſſary ſkill, ſhall be capable of attending to, and teaching the cultivation of the vine, in any part of the country to which they may be called; and giving inſtruction in the arts of making wine, brandy and vinegar, from the juice of the grape.

OBSTINATE ERUPTION *over the whole* SURFACE *of the* BODY *cured by* CHALK *(Alkaline Earth, or Carbonate of Lime).*

I was taught, thirty years ago, ſays Dr. Barker, of Portland, that mercury was the greateſt corrector of the animal fluids and humors in diſeaſe, and have made a liberal uſe of it in my practice; but I never could be convinced that it poſſeſſed any ſuch power. I have been induced to believe that even *chalk* is a much greater corrector and purifier of the fluids and humors than quick-ſilver.—The following caſe ſeems to corroborate the idea.

A child, fifteen years ſince, when about twelve months old, was obſerved to have a troubleſome eruption upon the face, which ſoon ſpread over the whole body, attended with itching and inflamination, diſcharging a corroſive humour, reſembling what is called tinea, or herpes. Cathartics, antimonials, lotions and unguents, were tried in vain. Mercury was then given for a conſiderable time, even to raiſe a ſalivation; but the complaint increaſed, and it was given up as incurable. It was greatly emaciated, though its appetite was good. In this hopeleſs ſituation it remained until eighteen months old; no medicine having been given for two months.—Its death was daily expected—nay, deſired.

At this critical juncture a piece of chalk was put into its hand, to amuſe it, and appeaſe its moans. This it readily eat, and cried for more, which was given; and it could not be pacified with leſs than two ounces in a day. This quan-

tity it daily conſumed for more than a month, when the corroſive liquor had ceaſed to ooze from the ſores, and the ſcabby eruption entirely diſappeared; ſo that, in a ſhort time, the child's health was regained, and it has ever ſince enjoyed that invaluable bleſſing.

I have ſeen ſeveral very ſimilar recoveries, from the uſe of chalk and lime-water, where mercury and other remedies had failed. As a collyrium, I find lime-water to be much more efficacious than any article I ever employed. It has effected ſome extraordinary cures, when the uſually reputed lotions have proved ineffectual, and even a mercurial ſalivation; ſo that I feel a perſuaſion that alkalines are of much greater utility, as correctors of vitiated fluids and humours, than mercury, antimony, or any other uſually reputed article.

Boston Prize-Medal.

The prize-medal, offered ſome time ſince by the Humane Society of *Boſton*, for the beſt collection of facts on yellow fever, has been adjudged to Samuel Brown, M. D. of that town; and his Diſſertation, we are glad to learn, has been publiſhed by direction of the ſociety.

Medicine.

M. Blanchet, of Quebec, intends ſhortly to publiſh a work, entitled, *Diſquiſitions on Medicine*, or *the Application of Chemiſtry to Phyſic*. In this piece the author purpoſes, among other things, to inveſtigate how far the laws of chemical action are applicable to explain the phenomena of *organic* matter.

Perpetual Sea-Log, *for determining, with greater certainty, the* Longitude.

A machine has been invented, by Mr. Gould, for meaſuring, with more correctneſs than by the common log, the velocity of a ſhip's paſſage through the water. It is conſtructed entirely of braſs, and conſiſts of a hollow cylinder, through which the water can flow with the greateſt eaſe; in the centre of which is hung an axis, with three arms and wings, fixed to ſuch a degree of obliquity, that they are made to revolve by the preſſure of the water on their ſides as it paſſes through. The motion thus produced is communicated to a connection of wheels and pinions, turning ſlower and ſlower, in rates ſo proportioned, that one revolution of the firſt meaſures 1-10th of a ſea-mile—of the ſecond, one whole mile—of the third,

ten miles—and of the fourth, one hundred miles, &c. in a decimal ratio. This invention is ſaid to obviate all objections made to the common log, except as to the meaſurement of currents, and to be little liable to get out of order. As it is kept continually overboard, all that is neceſſary is to take it in for inſpection at every new courſe. A patent has been obtained for it.

The EARTH *beſprinkled with a* YELLOW POWDER, *miſtaken for* SULPHUR.

On Saturday, the 12th of April, 1800, the weather, from being overcaſt in the morning, in the ſouthern part of the State of New-York, became, toward noon, rainy and ſtormy. The ſtorm increaſed at evening, and there was conſiderable lightning during the night. Much rain fell; and it was remarked, on Sunday morning, that the ponds and puddles of water in the country, both on Long-Iſland and in New-Jerſey, were covered with a yellow ſcum or powder, having ſome reſemblance of ſulphur. This appearance was alſo very much noted in the ciſterns and reſervoirs of water in the city of New-York, and on the pavements generally: and it was currently reported, by ſome perſons, that there had been a ſhower of brimſtone. It is moſt probable, however, that the ſubſtance was the *farina fœcundans* of vegetables, as ſeveral ſpecies of willow (ſalix), birch and alder (betula), and maple (acer), were at that time in bloom; and that the pollen of their flowers was wafted about thus extenſively by the wind. It was affirmed by ſome, that the powder was inflammable, and ſmelled like ſulphur on being burned; but this we believe to be a miſtake, as on our trials with it, no ſulphureous ſmell or trace of any kind was obſervable. On the contrary, it appeared, on being examined with the mieroſcope, to be an organic ſubſtance, exactly reſembling vegetable pollen.

ADVANTAGES *of* STUDYING PHYSIC *in* AMERICA.

The medical information to be acquired in the ſeminaries of America is very great. New-York, Philadelphia, Cambridge, Baltimore and Hanover, have their inſtitutions for promoting the knowledge of medicine. And beſides the libraries and lectures which ſtudents may frequent at theſe places, the opportunities of practical inſtruction which the plague or yellow fever, and the endemic diſtempers of the hot ſeaſon, afford, are uncommonly great; while in New-York and Phi-

ladelphia, the benefits of clinical inſtruction, at the reſpective hoſpitals, under RODGERS and RUSH, are added to the ſtock of means. With all theſe opportunities, which the weſtern continent ſo invitingly holds out to her citizens, is it expedient that the American youth ſhould ſo commonly go to Europe for medical education? After acquiring what the ſchools afford them there, our young phyſicians too often return to America, inſtructed in almoſt all things but thoſe which it moſt becomes them to know; viz. the cauſes, ſymptoms, prevention and cure, of the diſeaſes of the country in which they are to live and to practice. How can a citizen of New-York or Philadelphia learn the mode of diſtinguiſhing or treating a yellow fever from profeſſors who never ſaw a caſe of ſuch a diſtemper in their lives? It would be much more to the purpoſe, if the young men of Great-Britain, particularly thoſe who are preparing for foreign ſervice in the army and navy, were to come to America for medical education, than for our youth to take hazardous and expenſive voyages, for this purpoſe, to that iſland. We are the more explicit in theſe remarks, becauſe we conſider the ſubject as important, and becauſe we are perſuaded that the medical opinions, publications and inſtitutions of this country, are by no means duly appreciated. The conſequence of this is, on their return from Europe, theſe American Doctors of foreign nurture and education are ſo totally uninformed of what is going on upon the great ſtage of medical action in the United States, that they are forced to commence a new career of ſtudy, to render them fit for underſtanding the climate, diſeaſes and remedies of the land in which they were born. Candour muſt admit, that the doctrine of fever, except where the exploded notions of atony and ſpaſm prevail, is well underſtood and taught in America.

FARRAGO *of* INGREDIENTS *in the* NITROUS *and* NITRIC ACIDS, *whereby they differ from the* SEPTIC ACID.

M. Carendeffez has found that the modification of the ſeptic acid, called in the ſhops, and in medicine, *nitrous* and *nitric*, is truly a compoſition of ſeveral acids. He has confirmed the account of the conſtitution of theſe adulterated forms of ſeptic acid, as ſtated in our vol. ii. p. 236 and 237. and entered into ſome further detail of particulars. M. Carendeffez affirms, that ſalt-petre (ſeptite of pot-aſh), from the manner of its preparation, &c. almoſt always contains a portion of common ſalt (muriate of ſoda); that when ſulphuric acid is

poured upon the ſalt-petre of trade and the ſhops, the muriatic acid being the moſt eaſily diſengaged and moſt volatile, riſes firſt in the form of a vapour, in which this acid predominates; and that afterwards the ſeptic acid vapours, which come over into the receiver, bring a portion of the ſulphureous acid along with them. He has uniformly obſerved, that every parcel of nitrous acid which he has examined, both that diſtilled by himſelf and that prepared by others, contained either muriatic acid or ſulphureous acid, or both. In order to prove the preſence of muriatic acid, M. Carendeffez adds the nitrate of ſilver, the metallic part of which is immediately precipitated with the muriatic acid, in the form of a luna cornea—and to demonſtrate the preſence of the ſulphuric acid, he adds either acetate (ſaccharum ſaturni) or nitrate of lead, the metallic part of which falls down in the form of a ſulphate of lead. To theſe admixtures of other acids M. Carendeffez aſcribes, in a good meaſure, the diminution of the activity and virulence of the native ſeptic acid, whereby it becomes capable of being employed as a medicine; though, from the varying and uncertain proportions of the ingredients which compoſe it, there will be a proportional variety and uncertainty in its effects, when internally adminiſtered.—The more nearly the nitric acid approaches to purity, the more powerfully he finds it operated upon by ſilver, copper and tin, notwithſtanding its ſtrength and concentration, provided its water of liquidity be not too much diminiſhed.

From all theſe experiments one truth is eſtabliſhed, and grows more and more bright—that the original and unmixed ſeptic acid, as formed in the incipient ſtages of putrefaction, and *before* its combination with pot-aſh into nitre, is exceedingly different in its qualities from that MEDLEY OF MATERIALS which enter into the conſtitution of the nitrous and *nitric* acids, during and *after* their ſeparation from that alkali.

MARYLAND SOCIETY FOR PROMOTING KNOWLEDGE.

A letter from Maryland, of March 3, 1800, mentions the aſſociation of a number of perſons in Baltimore into a ſociety, or an academy, which has adopted the title of "The Maryland Society for promoting Uſeful and Ornamental Knowledge." This is agreeable intelligence. We hope the members will perſevere in their undertaking, and that ſucceſs and uſefulneſs will crown their labours.

PATENT *for* DIMINISHING EXPENSE *and* FRICTION *in* MACHINES, *by means of* LEAD.

Letters patent have been recently obtained, by William Shotwell, of Bridgetown, New-Jerſey, for his diſcovery of a repulſive power in lead, and in alloys of lead and tin, whereby they are leſs ſubjected to wear and waſte by friction than iron and the harder metals are. The patentee purpoſes to avail himſelf of this repellant quality of lead, to leſſen attrition and coſt in the blocks of pullies, in the boxes of carriage wheels, in the ſupports for mill-gudgeons, and in ſimilar caſes. Experiments which have been made warrant the belief, that Mr. Shotwell's diſcovery may be applied to a multitude of uſeful purpoſes.

PRIZE-QUESTION.

The *Philadelphia Medical Society*, deſirous of increaſing the ſtock of uſeful medical knowledge, have determined to offer a medal, of the value of ſixty dollars, for the beſt diſſertation in anſwer to the following queſtion: "What are the effects of the following medicines upon the human body, eſpecially upon the pulſe; viz. hyoſcyamus niger (black henbane), datura ſtramonium (thorn-apple), conium maculatum (hemloc), camphor, amber, muſk, digitalis purpurea (fox-glove), ſcilla maritima (ſea-ſquill), rhododendron maximum (an indigenous American plant, called mountain laurel), and the principal preparations of lead."

Diſſertations on this ſubject, competing for the prize, and written either in the Engliſh, French, or Latin languages, muſt be forwarded (poſt paid) to the ſecretary of the Philadelphia Medical Society, on or before the firſt Saturday in February, 1802. To each of the diſſertations a motto muſt be prefixed, and the ſame motto muſt be put upon the back of a ſealed letter, containing the name of the author. All the diſſertations, excepting that to which the prize ſhall be adjudged, will be returned to any place that may be directed, with the letters which accompanied them unopened. Thus the names of unſucceſsful candidates will be known only to thoſe to whom they may themſelves communicate them.

By order of the Society,

BENJAMIN S. BARTON,
JOHN MOORE,
GEORGE LEE

Philadelphia, March 1, 1802.

Request to Patentees.

As many inventions are making in the United States, which are fecured to the proprietors by letters patent, according to the act of Congrefs, the editors conceive the Medical Repofitory would be a good medium for patentees to make their difcoveries extenfively known. They therefore requeft, that fpecifications of patents may be fent them, free of expenfe, from all parts of the nation, for infertion. In attending to this branch of information, both the intereffs of the patentee and of the public will be attended to, as there can fcarcely be a more convenient vehicle of intelligence than this work.

Manufacture *of* Neutral Salts *in* New-York.

Confidering the utility and elegance of the neutral falts which have foda for their bafis, it muft be agreeable to our readers to learn, that M. De Carendeffez, formerly of St. Domingo, prepares feveral of thefe wholefome and excellent medicines in the city of New-York. He obtains his foda by the decompofition of fea-falt with oxyd of lead, and thereby procures, in the fame procefs, muriate of lead, or patent yellow. The foda thus feparated is afterwards fuffered to combine with fixed air, into a *carbonate of that alkali*, which is very pure and beautiful. M. Carendeffez, who likewife feparates the phofphoric acid from its calcareous connection in animal bones, combines it with the mineral alkali, into *phofphate of foda*, one of the more fafe, pleafant and efficacious of the neutral falts. He decompounds fea-falt by means of the carbonate of pot-afh, and thus obtains, by a double elective attraction, carbonate of foda and muriate of pot-afh (falt of Sylvius); after which the muriate of pot-afh, being decompofed by fulphuric acid, yields fulphate of pot-afh, or vitriolated tartar. He further decompofes tartrite of pot-afh, or cream of tartar, directly by the fulphuric acid; and with the tartaric acid fo obtained, he, with the aid of foda, produces tartrite of foda, or Rochelle falt (fel de feignette).—We congratulate our medical brethren on the domeftic manufacture of thefe combinations of foda, with the carbonic, phofphoric, and tartaric acids, as we confider them among the moft valuable articles of the materia medica, againft the diftempers of the hot months in our climate; a time of the year when the ordinary fupplies of thefe fubftances, imported from Europe, have been frequently fought, at the ftores of the druggifts, in vain. We wifh fuccefs to M. Carendeffez's manufacture, and hope the wholefale and retail dealers

in the articles enumerated, will give him encouragement. He alſo decompounds the muriate of ſoda by the ſulphuric acid, and prepares both *ſulphate of ſoda* (Glauber's ſalt) and muriatic acid. We have ſeen ſome cryſtallizations of borate of ſoda (borax), which had been very nicely purified by the ſame operator.

MEDICAL GRADUATION *in* DARTMOUTH COLLEGE.

At a commencement held at Dartmouth College, on the 28th of Auguſt, 1799, the degree of M. B. was conferred on the following candidates, to wit:

Nathan Noyes, of Newbury, Maſſachuſetts. Inaugural Diſſertation on Febrile Heat.

Daniel Adams, of Townſend, Maſſachuſetts. Diſſertation on the Principle of Animation.

Abraham Hedge, of Woodſtock, Vermont. Diſſertation on the Medicinal Uſe of Water.

PECULIARITY *of the* MALE PARENT *manifeſting itſelf in his* OFFSPRING.

A man lately reſided in New-York, who, beſides the *four* fingers belonging to the human hand, poſſeſſed, on each hand, a fifth, which was connected with the hand at the junction of the little finger to the metacarpal bone. From this ſpot it grew out laterally, at about a right angle from the outſide of the hand and from the little finger. It was ſmaller than that finger, but was furniſhed with a nail. The wife of this man was a healthy woman, without any bodily peculiarity: yet the children ſhe bore, though healthy and well-made in other reſpects, had the *monſtrous appendages* to their hands, in the ſame places, and after the ſame manner, that their father had.

SPECIMENS *of* SULPHUREOUS MINERALS *from the* SOLFATARRA.

The Mineralogical Society of New-York has received ſeveral ſpecimens from Italy, which illuſtrate the formation of ſtrata of gypſum. 1. Amorphous native brimſtone. 2. Cryſtallized ſulphur. 3. Brimſtone mingled with calcareous earth, in the form of a ſulphure of lime, or calcareous hepar. 4. Oxygenated ſulphur combined with lime into a true plaſter-ſtone, or gypſum. In this latter are ſtill to be ſeen bits of ſulphur in their native ſtate, not yet acidified, and filling up the holes of the plaſter of Paris. Thus, in this ſeries of ſpecimens, can it be ſeen how ſtrata of *carbonate of lime*, or

common limeſtone, in the Solfatarra, ſhall, by the oxygenation of the ſulphur in its immediate vicinity, part with its fixed air by the powerful attraction of another acid, and turn to a *ſulphate of lime*, or plaſter of Paris.

Sicilian Wheat.

Through the generoſity and public ſpirit of Mr. Roulet, two barrels of wheat, juſt imported from Palermo, have been preſented to the Agricultural Society of New-York. They are of the kinds called, in Sicily, *tritico tenero* and *tritico duro*. As the cultivation of theſe ſorts of grain may have a tendency to improve our crops, by introducing new and valuable varieties, the ſociety have directed them to be cultivated, and ordered that Meſſrs. John Stevens, Daniel Ludlow, Ezra L'Hommedieu, and Samuel L. Mitchill, make experiments on their growth and productiveneſs, and report the reſult to the Society.

Facts *in* Natural History—*noted during the Summer and Autumn of* 1799, *by S. L. M.*

1. *A Locuſt-Tree putting forth Bloſſoms a ſecond Time, after having been ſtruck by Lightning.*

A locuſt-tree (robinia pſeud-acacia), after flowering-time, was ſtruck with lightning. The ſtroke was very violent, and, apparently, deprived it of life. The leaves withered, and the foot-ſtalks dropped off. After ſome days, however, the tree ſhewed tokens of returning animation, and new buds began to unfold. From theſe buds a freſh crop of leaves proceeded; and, what was exceedingly remarkable, ſuch was the peculiar condition of this tree, *that a ſecond ſet of bloſſoms made their appearance, many weeks after the firſt had withered and been ſhed by this and the neighbouring ones.* Since this ſecond exertion, which, it was apprehended, would have exhauſted the remaining powers of the tree, it continued to ſprout and grow annually, and was in a thriſty condition three years after the accident.

2. *Regeneration of the Bark of Apple-Trees.*

In general, to ſtrip off the bark of trees is to kill them: and yet there is a time of the year when apple-trees (pyrus malus) may be peeled from their roots to their boughs, on all ſides, without ſuſtaining any damage from the operation. The experiment was made this ſeaſon (1799) upon one of

my apple-trees, whose whole body was deprived of its covering of bark, and whose branches, nevertheless, retained all their leaves and fruit. It is now two months since the tree was laid bare, and an entire new coat of bark has been formed, which invests the wood on every side; and it appears as healthy and vigorous as ever. The season for doing this is when the days are longest—that is, toward the end of June. A tree, peeled last summer, has lived over the long and severe winter of 1798-9, and is in no respect injured. Another, which was denuded in June, this year, has reproduced its bark completely (September), and is as full of fruit and leaves as if nothing had been done to it. There is no doubt that an orchard might be treated in this manner with perfect safety, if the operation was well-timed. The farmers say it will make old trees young again. But I own, though I have several times been witness of the harmlessness of the practice, it looks to me still like a very violent and hazardous remedy.—The experiment, however, demonstrates a most remarkable power in the vegetable economy.—Whether other trees may be thus decorticated with safety, I have not yet learned.

3. *Retrograde Motion of Sap in a Wild Cherry-Tree.*

On my farm, two wild cherry trees (prunus virginiana) grew within two feet of each other. The body of one of these trees was forked, and a branch of the other grew between the ramifications. In the progress of vegetation the three boughs came into contact, and grew fast together. The inosculation was so complete, that the foreign branch appeared to have united firmly with the tree by which it was embraced at the bifurcation. To shew whether or not this was truly the case, the tree with which the branch of the other had formed this connection was *girdled*, or deprived of a ring of bark near its root. The part of the tree below the girdle died, and the roots soon became juiceless; but the top continued to grow, and to bear leaves and fruit for several years after; its nourishment being furnished wholly from the foster-branch deriving sap from its own neighbouring trunk, and supplying the tree with which it was now consolidated. But this was not all:—The distance from the place of the branch's insertion in the body of the tree to the place where it was girdled, was about eight feet: yet down to that place, or a little above it, the body continued to live and grow, and to put forth shoots. This must have been caused by a retro-

grade motion of the ſap, through all that diſtance from the point of the union between the branches above.—Something of the ſame kind has been known to happen in other trees.

4. *On the Multiplicative Power of Fiſhes.*

In 1790, Uriah Mitchill, Eſq. High-Sheriff of Queen's County, and myſelf, went to Rockonkoma Pond, in Suffolk County, a diſtance of about forty miles, in a waggon. The object of our journey was to tranſport alive ſome of the *yellow perch*, with which this body of water abounds, to Succeſs Pond, in the town of North Hempſtead. We took about three dozen of thoſe which had been wounded moſt ſuperficially by the hook, and were ſo fortunate as to diſmiſs all of them but two, into Succeſs Pond, in a condition vigorous enough to ſwim away. We were enabled to do this by filling a very large churn with the water of Rockonkoma Pond, and putting ſo few fiſhes into it, that there was no neceſſity of changing it on the road, and afterwards driving ſteadily on a walk the whole diſtance, without ſtopping to refreſh either man or horſe. In two years theſe few fiſhes multiplied ſo faſt, and became ſo numerous, that they might be caught with the hook in any part of the water, which is about a mile in circumference! What prodigious increaſe in their new ſituation! Whereas, if they had remained in the water of their nativity, already ſtocked very full, their offſpring would have been comparatively inconſiderable. So true is it of theſe, as well as of human and other animals, that nothing limits their increaſe and multiplication but the want of ſubſiſtence.—When Succeſs Pond is ſupplied with as many yellow perch as it can feed, either there will be fewer eggs ſpawned and hatched, or, of theſe little creatures, a ſmaller proportion will become grown fiſhes. A vaſt number of them, like the children of the Chineſe and other fully-ſtocked nations, muſt periſh for want of food, and thereby their multiplication muſt be limited.

Air produced, without Limitation, *from* Water *by* freezing.

Dr. Prieſtley has waved the objection to Dr. Mitchill's idea of the identity of phlogiſton and hydrogen, provided the latter be not made a component part of water. Dr. Prieſtley has nearly completed a courſe of experiments on the freezing of water. He finds this proceſs far more effectual in getting air from it than the Torricellian vacuum, which he has chiefly

uſed hitherto. He obſerves, if the water be frozen ever ſo often, a quantity of air will be got from it, and the harder the froſt, the more air is produced. To appearance, this proceſs has no limit; ſo that the *whole* of the water may be converted into air, and this air is *phlogiſticated*, or chiefly ſo.

TRANSACTIONS *of the* ACADEMY *of* MEDICINE.

The academy of medicine in Philadelphia, we are informed, will publiſh a volume of tranſactions in a few weeks. It will conſiſt altogether of documents and facts calculated to aſcertain the origin and beſt modes of treating the yellow fever.

REMEDY *for* EPILEPSY.

Profeſſor Ruſh has lately ſucceeded in curing a boy of epilepſy, by giving him two grains of ſaccharum ſaturni (acetate of lead) three times a day. He has, beſides, ſuſpended the fits for ſeveral weeks, by the ſame doſe of that medicine, in two patients in the Pennſylvania Hoſpital. By creating ſome diſorder in the bowels, the remedy was prevented from being increaſed in the latter caſes, and the ultimate ſucceſs of it was thereby, in all probability, diſappointed.

FOREIGN.

Dr. BEDDOES' MEDICAL PNEUMATIC INSTITUTION.

ALL who wiſh well to the intereſts of humanity, will rejoice to learn that this inſtitution, as uſeful as novel, is at laſt ſo far eſtabliſhed, that there is every reaſonable ground to believe the objects of it will now receive that ample and fair inveſtigation their importance demands. The learned, ingenious, and meritoriouſly perſevering founder of it, has already publiſhed a *Notice of Obſervations made at the Inſtitution*, which contains ſome highly intereſting remarks on the effects of a gas not before applied to medicine, but which promiſes, in ſkilful hands, to be one of the ſafeſt and moſt powerful agents hitherto diſcovered.

Mr. Davy, ſuperintendant of the inſtitution, than whom it would hardly be poſſible to find one better qualified for the ſituation, having made ſome experiments on *dephlogiſticated nitrous gas*, ſo named by its diſcoverer, Dr. Prieſtley, which proved that its compoſition, properties, and mode of action,

had been miſtaken by the lateſt experimenters, was induced to inhale it. Dr. Beddoes relates the circumſtances in the following words:

"The firſt inſpirations of the gas produced giddineſs, fulneſs of the head, and, in ſhort, feelings reſembling thoſe of incipient intoxication, but unaccompanied by pleaſurable ſenſation. At this next experiment I was preſent. The quantity was larger, and the gas more pure. The ſcene exhibited was the moſt extraordinary I had ever witneſſed, except in the caſe of that epileptic patient, whom I have deſcribed (*Conſiderations on Airs*, part iv. p. 13) as agitated, in conſequence of the reſpiration of oxygen gas, with a long ſucceſſion of the moſt violent movements. The two ſpectacles differed, indeed, eſſentially, in one reſpect. In the former every thing was alarming: in the latter, after the firſt moments of ſurpriſe, it was impoſſible not to recognize the expreſſions of the moſt ecſtatic pleaſure. I find it entirely out of my power to paint the appearances, ſuch as they exhibited themſelves to me. I ſaw and heard ſhouting, leaping, running, and other geſtures, which may be ſuppoſed to be exhibited by a perſon who gives full looſe to feelings excited by a piece of joyful and unlooked-for news. As in the caſe of the epileptic patient, *no wearineſs or depreſſion followed*; ſo, in this caſe, *no exhauſtion, or languor, or uneaſy feeling took place.* The experiment Mr. Davy has very frequently repeated, and, generally, with the higheſt pleaſurable ſenſations; and, except under particular circumſtances, with conſiderable muſcular exertions, which have not, in any inſtance, been ſucceeded by fatigue or ſadneſs."

A number of perſons afterwards inhaled the ſame gas. The following extracts will convey ſome idea of the very ſingular effects produced by it.

"Mr. J. W. Tobin (after the firſt imperfect trials), when the air was pure, experienced ſometimes ſublime emotions, with tranquil geſtures—ſometimes violent muſcular action, with ſenſations indeſcribably exquiſite—no ſubſequent debility—no exhauſtion.—His trials have been very numerous. Of late he has felt only ſedate pleaſure. In Mr. Davy the effect is not diminiſhed.

"Mrs. Beddoes. Pretty uniform pleaſurable ſenſations—propenſity to muſcular exertion—could walk much better up Clifton-Hill—has frequently ſeemed to be aſcending like a balloon, a feeling which Mr. Burnet ſtrongly expreſſed.

"Mr. James Thomſon. Involuntary laughter—thrilling

in his toes and fingers—exquisite sensations of pleasure—a pain in the back and knees, occasioned by fatigue the day before, recurred a few minutes afterwards. A similar observation we think we have made on others; and we impute it to the undoubted power of the gas to increase the sensibility, or nervous power, beyond any other agent, and probably in a peculiar manner.

" Mr. Stephen Hammick, surgeon of the Royal Hospital, Plymouth. In a small dose, yawning and languor.—It should be observed, that the first sensation has often been disagreeable, as giddiness; and a few persons, previously apprehensive, have left off inhaling as soon as they felt this.—Two larger doses produced a glow, unrestrainable tendency to muscular action, high spirits, and more vivid ideas.

" Mrs. Barbauld, *the children's friend*. At first pleasurable sensations, occasioning involuntary laughter—some momentary faintness afterwards.—We now understood the regulation of the dose, so as, perhaps, to be able to remove Mr. Barbauld's languor, and to give Mrs. Barbauld the pleasure, without the transitory faintness.

" Mr. William Clayfield has most resisted the effects of the gas. Pretty strong doses produced a transitory intoxication. In two instances, very large doses have excited the violent muscular orgasm, accompanied with exquisite pleasure, and followed by no debility.

" Mr. Robert Southey could not distinguish between the first effects and an apprehension, of which he was unable to divest himself. His first definite sensations were, a fulness and dizziness in the head, such as to induce fear of falling. This was succeeded by a laugh, which was involuntary, but highly pleasurable, accompanied with a peculiar thrilling in the extremities—a sensation perfectly new and delightful. For many hours after this experiment, he imagined that his taste and smell were more acute, and is certain that he felt unusually strong and cheerful. In a second experiment he felt pleasure still superior, and has since poetically remarked, that he supposes the atmosphere of the highest of all possible heavens to be composed of this gas.

" Robert Kingleake, M. D. Additional freedom and power of respiration, succeeded by an almost delirious, but highly pleasurable sensation in the head, which became universal, with increased tone of the muscles. At last an intoxicating placidity absorbed, for five minutes, all voluntary power, and left a cheerfulness and alacrity for several hours. A second

ſtronger doſe produced a perfect *trance* for about a minute; then a glow pervaded the ſyſtem. The permanent effects were, an invigorated feeling of vital power and improved ſpirits. By both trials, particularly by the former, old rheumatic feelings ſeemed to be revived for the moment.

" Mr. Wedgwood, after breathing ſome time, threw the bag from him, kept breathing on laboriouſly with an open mouth, holding his noſe with his left hand,* without power to take it away, though aware of the ludicrouſneſs of his ſituation. All his muſcles ſeemed to be thrown into vibratory motion—he had a violent inclination to make antic geſtures—ſeemed lighter than the atmoſphere, and as if about to mount. Before the experiment he was a good deal fatigued, after a very long ride, of which he permanently loſt all ſenſe. In a ſecond experiment, nearly the ſame effects, but with leſs pleaſure. In a third, much greater pleaſure."

After ſome time Dr. Beddoes tried the effects of the gas in his own perſon, and we ſhall quote the account of his feelings:—

" The firſt ſenſations had nothing unpleaſant; the ſucceeding have been agreeable beyond his conception or belief, even after the rapturous deſcriptions he had heard, and the eagerneſs to repeat the inhalation which he had ſo often witneſſed. He ſeems to himſelf, at the time (for why ſhould one fear to uſe ludicrous terms when they are expreſſive?) to be bathed all over with a bucket full of good humour; and a placid feeling pervades his whole frame. The heat of the cheſt is much greater from a ſmall doſe than he ever felt from the largeſt quantity of oxygen. A conſtant fine glow, which affects the ſtomach, led him one day to take an inconvenient portion of food, and to try the air afterwards. It very ſoon removed the ſenſe of diſtention, and, he ſuppoſes, expedited digeſtion. He has never tried to bring on the high orgaſm, but has generally felt more alacrity at the moment—not one languid, low, *crapulary* feeling afterwards. It occurred to him that, under a certain adminiſtration of this gas, ſleep might poſſibly be diſpenſed with—he is ſure that from leſs ſleep he derives more refreſhment than for many years paſt. And his morning alertneſs equals that of a healthy boy."

The caſes in which its effects were prejudicial are alſo ſtated with great candour. Theſe were of the hyſterical kind. But the conſideration of the whole of theſe phenomena led

* This was practiſed in all the experiments.

to a happy application of the gas to the cure of palsy, and of diseases proceeding from a defect of nervous energy; and several instances of success are stated, which are well deserving of attention.

"We desire further," says the author, "to try the effects of our new agent in palsy, and in the various cases of *true* deficiency of nervous power, which we have well learned to distinguish from cases of relative defect of irritable power. As the limits of the efficacy of every remedy ought to be determined, we shall not shrink from any case by reason of its inveteracy. We intend to oppose our Nepenthe to the equable decay induced by time and intemperance; and we hope to palliate some of the evils of extreme old age itself.

"We are emboldened, by experience, to pledge ourselves for the safe employment of the gas. We shall, indeed, be sadly disappointed, if it does not sometimes prove the most delicious of luxuries, as well as the most salutary of remedies. In saying this, it may be allowed me to suggest to those who have not attended to the tenor of my opinions, that I now, for the first time, venture to hold forth these hopes. However urgently I may have recommended the investigation, my language, with regard to its issue, has always been, that *I would not answer for the discovery of a gaseous remedy in any denomination whatever of disease. That natural or forced decay may be repaired, and the faculty of pleasurable sensation renovated*, is now no longer mere conjecture, supported by loose analogies—we see the strongest probabilities daily accumulating in favour of the opinion. It must only be remembered, that so desirable a change cannot be effected by the agent, applied in *any* manner, to *any* constitution. It must be *properly* used in *proper* cases.

"Considering the present abundance of expert chemists, we cannot presume that others will not be able to prepare the gas perfectly without our instructions. Nevertheless, those who attempt to use it medicinally should be apprized that the utmost care is necessary in its preparation and employment. A deleterious, instead of a salutary fluid, as the author can attest from his own painful experience, may easily be obtained. Probably neither Dr. Priestley, nor the Dutch chemists, ever procured that which can be respired with safety. The difference, and its causes, will hereafter be pointed out.

"If, therefore, in consequence of that promptitude which journals afford, experiments, tending to invalidate any part of

the preceding ſtatement, ſhould be publiſhed, we hope that its perfect fidelity will not, on that account, be doubted. The experimenter will be found to have employed a different agent from ours. This we have no heſitation in declaring that we ſhall be able to ſhew."

[*Phil. Mag. and Mon. Rev. for Dec.* 1799.

ARTIFICIAL COLD.

A method has been lately diſcovered of producing a degree of artificial cold, much more intenſe than was ever before known. It conſiſts in the ſimple mixture of ſulphuric and muriatic ether; an inſtantaneous evaporation takes place at the moment of union, accompanied by ſo rapid an abſorption of heat, as not only to congeal mercury, but even to reduce the gaſeous nitrous acid to a liquid form.

[*Lond. Monthly Mag. No.* 55, *p.* 59.

ANASARCOUS INFLAMMATION *of the* LOWER EXTREMITIES.

Dr. Ferriar, of Mancheſter, has uſed the infuſion of *digitalis*, as a lotion, with remarkable ſucceſs, in the inflammatory affection accompanying anaſarca of the inferior extremities. As this ſpecies of inflammation has hitherto proved intractable, he wiſhes to communicate a knowledge of the method of cure without delay.

[*Monthly Rev. for Nov.* 1799, *p.* 360.

END OF VOLUME III.